COMPUTERWORLD

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Lawsuits Not Solution

User-Vendor Contract Problems Can Be Avoided

By Edward J. Bride
CW Staff Writer

BOSTON – The spectre of computer users lining up to take shots at their vendors, either through antitrust or breach of contract suits, is as disturbing as it is avoidable, according to users and attorneys involved in this messy business.

Users who entered the computer community in the first or second generation had little legal expertise to help fend off the problems of late deliveries or inadequate software, but the situation is changing now.

The abundance of lawsuits, which peaked last year [CW, Dec. 30-Jan. 6], has demonstrated that users no longer are sitting back and permitting their contracts

Spotlight on User's Lib

or their computer systems to be shuffled around at the whims of salesmen or corporate executives.

Lawsuits, while highlighting the problem, do little to solve it. Indeed, past problems or contract inadequacies may not be able to be "solved," but they can be avoided in the future.

This is the attitude of Roy N. Freed, a local attorney who says computer contract deficiencies normally arise from avoidable situations that can be anticipated and covered in a well-written document.

Many vendors now treat users as equal parties in the contracting procedure, but each user must insist on this right. Users can insure on-time delivery or backup facilities, but this contingency must be covered

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Taxing Job

Keypunch operators convert 130,000 income tax returns a day into computer format, during the current peak period at the Northeast Regional Service Center of the Internal Revenue Service at Andover, Mass. The center is one of seven, and 800 IBM 024 keypunch machines are "manned" continuously during tax time. Story on Page 6.

'Manipulation' of Penn Central Computers Cited in Boxcar Theft

By Thomas J. Morton
CW Midwest Bureau

CHICAGO – According to U.S. attornies here and in Philadelphia, someone had to "put the fix" on Penn Central Railroad's computers to shuttle at least 217 boxcars to a tiny downstate Illinois railroad, and to "make them disappear."

In Philadelphia, a Federal Grand Jury is beginning the investigation of the disappearance of over 2,800 railroad boxcars on railroads throughout the country.

Recently, FBI agents located the 217 "missing" Penn Central boxcars on the tracks and in the yards of the LaSalle and Bureau County Railroad, a line located some 100 miles west of Chicago with a total of 15 miles of track.

Peter Vaira, a U.S. attorney here in Illinois and deputy chief of a Federal Strike Force on Organized Crime, hinted that there had to be "some manipulation" of the Penn Central computers to obtain output to allow the boxcars to be sent to LaSalle and Bureau County tracks. Trains are assembled through a computerized printout of car numbers.

Vaira said that the government also suspects that there was "tampering" of the Penn Central data records. He said that the government feels that someone on the inside at the railroad may have been modifying the input data to record that the car was scrapped or wrecked.

Normally, a Penn Central spokesman said, a railroad runs a computerized equipment register program on its rolling stock.

Basically, he said, every car that is on the railroad, whether it is owned by the railroad or not, is recorded. The input covers every move of that car . . . . what train it is in, toward what terminal, if it is in the [repair] shop, when it comes out of the repair shop . . . . as long as it is on the lines of the railroad.

If the car is owned by the railroad and goes to the tracks of another railroad, the owning railroad just notes that the car has gone to the other line. Specific information as to its exact whereabouts would be obtained from the computers of the other railroad.

(Continued on Page 2)

Tax Firms Not Bound To Protect Your Data

WASHINGTON, D.C. – If your tax return is prepared by a commercial service, there is no law to prevent that company from selling the data to credit bureaus, local merchants or detective agencies, according to Joseph A. Whitehead, executive vice-president of the National Association of Professional Tax Preparers.

Noting the increase in computers to calculate tax data, Whitehead warned that it is impossible to tell what happens to the information fed to the computers. Approximately half of all tax returns are now prepared by commercial services, he said, but apparently only one state (Calif.) has any laws to protect the confidentiality of information supplied.

Gallagher Bill

Rep. Cornelius E. Gallagher (D-N.J.) has introduced a bill to make it illegal for a tax service to disclose any information without the consent of the individual who supplied the data. Gallagher is particularly concerned that computers will use the data to create sophisticated mailing lists, and his bill would specifically prohibit such action.

Noting that government agencies issue subpoenas to credit bureaus in order to get data, and that these companies rarely protest the subpoenas, Gallagher has included in his bill a special provision to give the individual the right to contest the subpoena.

On the Inside

Computers at War

Vietnamization Includes DP, Too

By Bernice Pantell
Special to Computerworld

SAIGON – U.S. computers are being turned over to the Vietnamese armed forces along with the job of fighting the Viet Cong.

This means a massive effort undertaken by the Vietnamese forces with the advice, assistance, encouragement and monetary support of the U.S.

And every indication is that computerization will be among the most successful aspects of Vietnamization.

Each of the Vietnamese services – the Vietnamese Air Force (VNAF), the Vietnamese Army (ARVN) and the Vietnamese Navy – is contributing to the Vietnamization, along with its U.S. military counterpart, at least as far as computers are concerned.

VNAF (called "Veenaf" here) is far and away ahead of the pack when it comes to using computers. It operates a Univac 1050 drum system at Bien Hoa Air Force Base, 35 miles north of Saigon. This computer system provides logistical support for VNAF bases throughout South Vietnam.

Bien Hoa is a bevy of activity, supporting both Vietnamese and American units. The Americans are leaving, however, and that is where the computers come in.

Logistical Support

The U1050 system was installed in March 1970 to provide logistical support to VNAF bases throughout South Vietnam.

U.S. Air Force experts installed in toto the standard Air Force Milstrip system for controlling, ordering, storing and distributing material, including fixed-wing aircraft and helicopter parts. This same system is operating at all U.S. Air Force bases as well and the programs are standardized. In fact, there is only one programmer at Bien Hoa to maintain the system for VNAF and he is an American. But several Vietnamese programmers will soon go into training to take on that responsibility.

The U1050 is a 28K drum system with two Fastrand units, each with a 66-million character capacity. It has two tape drives which are used as file loaders and for dumping backup files

(Continued on Page 4)

☆ 1971 ☆
Memories Supplement
Follows Page 18

Emotional Business

Biggest MIS Problems May Be Caused by Humans

By Phyllis Huggins
CW West Coast Bureau

LOS ANGELES – The biggest problems in developing management information systems may be human rather than technical, according to experts speaking at a three-day MIS symposium here. The feeling at "Information Systems for Management," sponsored by the University of California at Los Angeles and Informatics, Inc., was that many managers are becoming frightened that MIS will hurt them more than help them.

Walter F. Bauer, Informatics, commented that MIS systems were difficult. "They interface with humans and therein lies a lot of trouble."

George Glaser, McKinsey and Co., agreed that it is an emotional business. "You can do a rational job and come up with a system that in an organization is ignored, reacted against, etc. Rational men are crushed."

Bauer interjected that the single most important success factor for an MIS system is to hand-circulate to everyone involved documentation of what the system does.

Warning

Several speakers warned that the most dangerous thing to do was to try to do too much. An MIS system should start out by degrees.

The second most dangerous element was deemed to be middle management. Not only did the speakers mention this fact, but so did the attendees. It was explained that top management wants to know what goes on, but middle management won't let it. Middle managers may fear that an MIS system with on-line data will leave them with no place to cover mistakes and will disturb the working balance of their methods.

They are also afraid it may increase their risk of job obsolescence and take decision making power away from them.

Philip Dorn, Union Carbide Corp., pleaded for the cautious approach. "No one seems to know how to manage large projects. Do one project, it works. Then the next one bombs." He doubts that any big project can be soundly managed.

Thomas DeMarco, Mandate Systems, Inc., said two elements cause problems. One is the fantasy that computers can do things that people can't do. The other is paranoia, the fear that an MIS system will replace people.

A member of the audience looked worried during the coffee break and said, "I'm glad my management isn't here. We are three months into a three to five year MIS program. If they were here it would be instant infanticide."

Three speakers spoke on systems they have been developing. Kenneth Boyd of Weyerhaeuser Co. summed up this by saying, "Does the system work and is everyone happy? Yes and no! Yes, the system works but it is not complete and there *is* disenchantment to be overcome if the system is going to be allowed to fulfill the promises of its creators."

Speaking for Informatics and its Mark IV MIS system, John Postley noted that his firm has 360 systems now working in the field. His point was that MIS can work. He also observed that the system had evolved over 10 years.

Murray Laver, of the British Post Office Corp., observed that MIS should be the nervous system of a business. Actually most of them are only automated accounting systems, he said. They serve the operational needs of middle management rather than the decision-making needs of top management.

"While Europeans do not reject the concept of MIS, it will have to come in modularly rather than monolithically. We have not produced in Europe the renaissance man who is skilled in management and management science."

"To design MIS you must have an agreement," Laver said, "between consenting adults. If managers are not included they will not use it well or when needed. The higher a man climbs in management the less reliable and less complete becomes the data he has to work with and the more ill-structured are his problems.

"More information cannot help but benefit management as they are now working without it, but we must take care to not design out 'serendipity.' Perhaps we should take into account human error. Maybe we will reject mentally the streams of concentrated perfect data an MIS system can produce. Maybe we need some 'noise' or roughage in the system. Concentrated data may be too much for us. We can't be creative eight hours a day, five days a week, 50 weeks a year."

Town Police Must Log Uses of DP Nets

WAYLAND, Mass. – So intense is the concern over the computer's use in privacy violation that a local citizen has succeeded in requiring the police to log all uses of computerized law enforcement systems.

Stanley Robinson, programmer, introduced the measure at a recent town meeting.

Under the article, when the police are preparing their annual town report, they must list the following information: the number of inquiries, by type and reason for inquiry; the results of inquiries, including arrests and any convictions; information entered by Wayland police into computerized systems; any troubles encountered, such as down-time, false arrests or invasion of rights.

Robinson told CW his measure was intended to draw public attention to the "continual expansion" of police information systems like the FBI's National Crime Information Center, and the planned criminal history extension of the NCIC.

The article specifically mentioned only NCIC, since the proposal was tied to a budget item for the NCIC computer terminal.

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FBI the Victim in Misuse And Theft of Data Files

WASHINGTON, D.C. – Hard on the heels of administration claims that governmental "self-discipline" could prevent abuse of federal data banks, a Chicago policeman has been indicted by a Federal Grand Jury for allegedly misusing an FBI National Crime Information Center (NCIC) file, and an activist group has sent copies of a stolen FBI intelligence file to two U.S. congressmen and the *Washington Post*.

Police Lt. Harry A. Smith was indicted in Chicago for allegedly acquiring the FBI's dossier on a financier "for his own personal use" and passing it on "for the personal use of others" to a brother-in-law, a lawyer, who was said to be considering the financier as a client.

Smith contends that his brother-in-law, as an officer of the court, is entitled to the information. The lieutenant faces a maximum penalty of five years in prison and a $5,000 fine if convicted.

The NCIC is currently adding criminal histories (rap sheets) to its computerized data bank.

Covers Peace and Black Groups

In Washington, meanwhile, Attorney General John N. Mitchell confirmed that the files sent to Sen. George McGovern (D-S.D.) and Rep. Parren J. Mitchell (D-Md.), as well as the *Post* were stolen from the FBI's Media, Pa., office March 8.

The records concern peace and black activist groups, and describe FBI surveillance activities.

The attorney general asked that the contents of the files not be disclosed on the grounds that they could "include information which would disclose the identity of confidential investigative sources and information relating to the national defense."

In testimony before the Senate Judiciary Subcommittee on Constitutional Rights recently, Assistant Attorney General William Rehnquist said that it was likely that "self-discipline on the part of the Executive Branch would provide an answer to virtually all legitimate complaints" about possible abuse of government data files.

Rehnquist added that the Federal Government's law enforcement responsibilities are "far-flung," and that it "would scarcely be surprising if there were not isolated examples of abuse."

Boxcar Case May Involve DP Tampering

(Continued from Page 1)

"This is a continuing thing," he said, "in which the progress of a given car is carefully monitored in the computer."

The spokesman pointed out emphatically that he "did not wish to have it understood that the equipment register program described was that particularly of Penn Central." He said he was describing the program in broad terms as to how a railroad keeps track of its cars.

He said he was unable to comment on the case or have anything specific to add other than the prepared statement of the railroad that said: "The information on which this action was taken [the grand jury investigation] was developed by the Penn Central Transportation Co.'s internal auditors following an intensive investigation over a period of several months. The evidence developed by Penn Central was placed in the hands of the Federal Bureau of Investigation."

Other officials would not say whether the computers were manipulated by falsified input or by someone altering the programs.

Boxcar's Role

A railroad executive here said that a boxcar, the familiar wooden box on wheels (some of which are made of steel and are refrigerated and could cost more than $60,000) of the American railroad scene, plays an important two-fold part in railroad economy.

It provides, he said, income by carrying freight and by being rented to other lines or to industry. Boxcar rentals, he said, can add up to millions of dollars annually for a railroad.

The government also suspects that organized crime is taking part in the boxcar theft. Louis Bechel, U.S. attorney in Philadelphia, has been quoted as saying, "We're looking for syndicate features of crime in this."

Reappearance

Penn Central officials would not comment on the appearance of 217 of their missing cars at LaSalle and Bureau County.

LaSalle and Bureau County officials said the cars belonged to two companies in New Jersey, and that the companies were responsible for the cars being on LaSalle and Bureau County tracks.

Investigators here discount the LaSalle and Bureau County story since the Penn Central cars seized by FBI agents bore the freshly painted initials "L & BC" on their sides. Some of the cars, investigators say, were painted so badly that the logo of Penn Central was still visible under the fresh paint.

Penn Central officials said they could not see how the merger of the Pennsylvania Railroad and the New York Central could cause a loss of cars since all cars were registered and numbered to either the Pennsy or the New York Central.

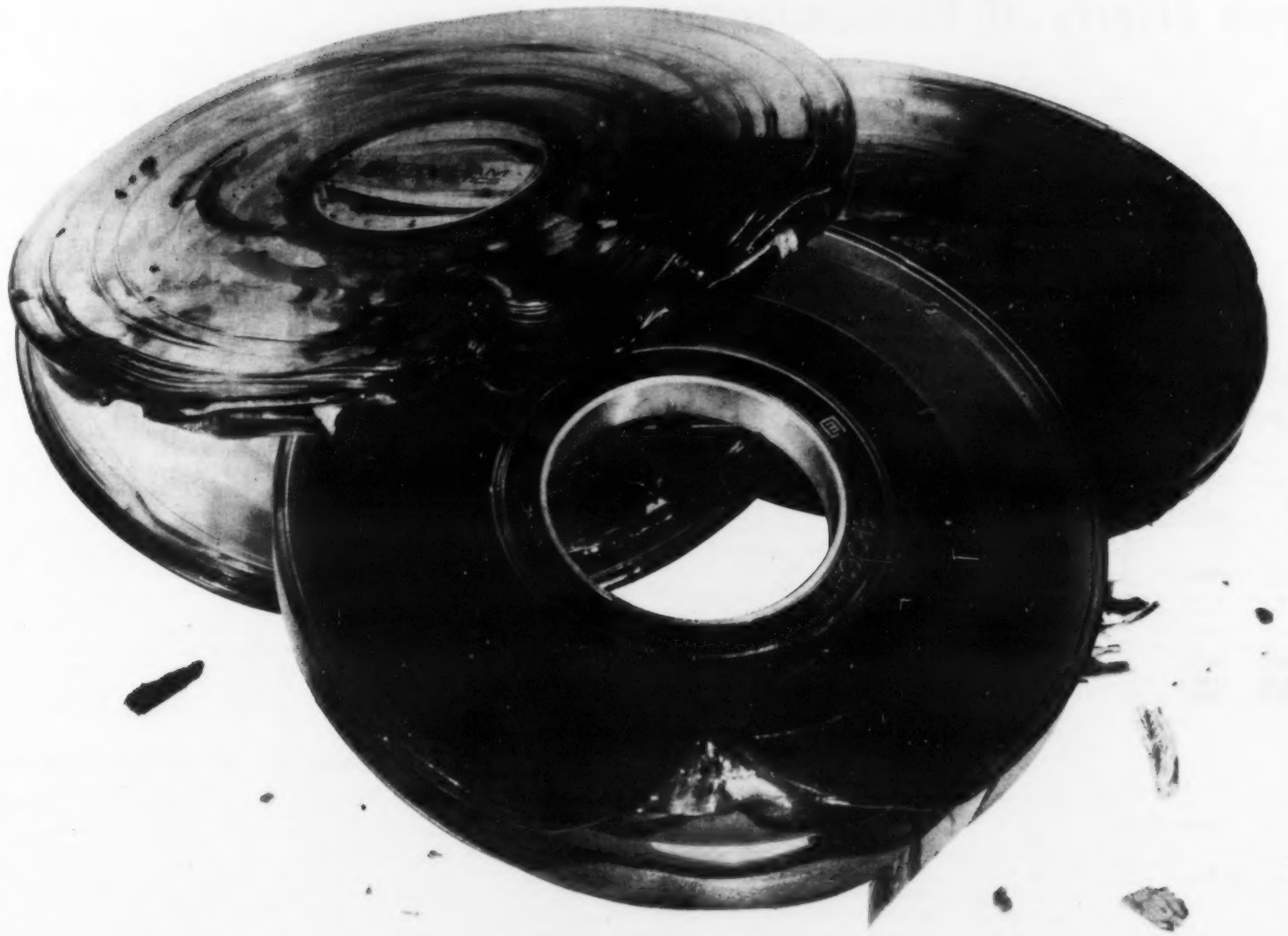
Other Lines

Some cars have not been on Penn Central tracks since the merger and are running on the tracks of other lines still wearing the old New York Central or Pennsylvania logos.

The Penn Central spokesman did admit that some problems of program compatibility did take place at the time of the merger and that "there was, for a period of time, a problem of feeding input to both computers, one system to another, and in having the computers communicate with each other. But that was solved by.... I don't know the technical term .... a melding of the two systems."

He said he did not feel the incompatibility problems caused any of the cars to be lost.

The canister melted; the flanges buckled. The tape came through.



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Here's how Epoch 4 came through:

Tape #1: no permanent errors; no temporary errors.
Tape #2: one permanent error; three temporary errors.
Tape #3: no permanent errors; one temporary error.
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Think it over. Maybe you'll never have a fire. But handling damage and storage stresses will always be around.

Your data deserves the extra protection of the toughest tape in the business.

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Lawsuits Don't Solve Problem

(Continued from Page 1)

specifically in the contract.

Likewise, software delivery and performance must be fully discussed; the user must make known his expectations before he insists on performance.

User-Vendor Friction

Freed claimed friction arises when users do not place themselves in strong bargaining positions, or when they do not cover their performance needs or back-up arrangments in the first steps of computerization: negotiating the contract.

In a recent *Boston Bar Journal*, Freed called on his colleagues to familiarize themselves with the legal aspects of computer technology "in order to serve our clients properly" and avoid litigation "by more effective contract negotiation and drafting."

He has been selected by the American Management Association (AMA) to lead a crusade against contract inadequacies, through seminars entitled "How to Negotiate and Contract for Computers and EDP Support Services."

When courts award huge judgments for inadequate service, faulty hardware or software or failure to deliver, both suppliers and users are usually to blame for "sloppy contracting practices," the AMA has said.

Because computer usage involves such a significant expense for many companies, such inattention to detail is a "glaring oversight," the AMA continued.

More important, because company operations are "critically dependent on continuous systems functioning in a way never before experienced," both the legal and technical experts must be briefed on each other's responsibilities and needs, the association noted.

DP Feels Effects of Vietnamization

(Continued from Page 1)

and transactions.

There are also 12 remote stations installed at various locations at Bien Hoa which are on-line to the 1050. This means immediate updating of files from receiving areas and for on-line inquiry for status from stock managers.

Remote terminals are being installed in all seven VNAF bases in South Vietnam, to complete a logistical satellite program in planning since the first computer arrived.

These bases are actually satellited upon Bien Hoa for supply now, but data is sent via Autodin, the U.S. communications network.

Large Setup

The Central Logistics Command, at Tan Son Nhut Airbase on the outskirts of Saigon, has a large tab setup, but is also using computer time on the Vietnamese Joint General Staff (JGS) computer installed and operated by the adjutant general (AG), just next door.

The Central Logistics Command may well have the most modern supply system in Vietnam by next year, however, because it is now programming a system tailored to its own needs from the U.S. Army standardized 3S system.

There will be a 360/40 system with 2314 disks, plus a 360/20 off-line printing system, plus a microfilm system for cataloguing. The 360/20 is being installed in March and the model 40 is due in July. The planned system is called Ramms, for the Republic of Vietnam Armed Forces Automated Material Management System. Ramms is expected to develop into a remote terminal system also.

The AG, next door to the Central Logistics Command, already has its own computer, a 360/20, 16K, disk and tape system. It is the oldest user of computers among the Vietnamese armed forces, having installed its first computer system in 1968.

The AG will upgrade to a Model 40 by the end of 1971, to process the more than one million personnel records maintained for all the armed forces.

It faces a slightly different problem than most AGs. If one hasn't heard of the Vietnamese problem with family names, he hasn't heard a real computer problem. Something like 75% of the men in its file have common family names.

There are only a dozen or so family names used in Vietnam. And many of the middle and first names are duplicated as well. Take Nguyen for example. It is the most common family name in Vietnam.

There may be as many as 100,000 Nguyens in the AG file. There are 12,000 Nguyen Van xxxs. There are several hundred Nguyen Van Quis and several hundred Nguyen Van Quys to keep track of, and heaven help the keypunch operator.

To complicate the problem, many of these men have duplicate ID numbers because there was a decentralized system for assigning them until a few years ago. It will take several years to sort this all out, but the problems will be solved.

To do so, there is the largest I/O control group on record. There are about 75 men and women in Control to validate data and correct exceptions.

The AG computer center is under the guidance of a knowledgable and inspiring director, Col. Ho, who not only runs the computer center but is a member of the government's Advisory Committee for the Improvement of ADP.

As such, he recommended and has seen adopted the Vietnamese expression for electronic computer: An-Bai Dien Tu. An-Bai comes from a religious concept suggestive of predestiny. It is meant to imply preprogrammed. Dien Tu corresponds roughly to our word computer. Everything Col Ho does is within a larger frame of reference, such as devising a term for computer that would force the user to think about what a computer is.

He encourages individual excellence from his staff, with many constructive results.

For instance, there is young Capt. Pho who translates technical publications from English to Vietnamese on his own time so that others on the staff might learn.

So far, he has translated six books on computers; the IBM programming manuals for RPG, Cobol and BAL; a pamphlet on systems analysis; and a publication from the U.S. AG school called *Introduction to ADP*. He also works full time in the systems branch! With this attitude it is easy to see why the Vietnamese do not give up in the face of a master file that has 750,000 common names.

But the Vietnamese Navy has not made much progress as yet in its use of computers. Efforts have begun, however. It already uses a tab system for resupply under Milstrip procedures, and has sent one man to the U.S. to study computer programming.

Both U.S. and Vietnamese Navy personnel are working on the problem of converting to computer processing. The U.S. Navy in Saigon has submitted a request to higher headquarters to obtain a computer for its Vietnamese counterparts which U.S. forces will also use until they are completely withdrawn. This request has not been approved yet.

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News Wrapup

Invasion of Privacy Inquiry Killed

WASHINGTON, D.C. – The House Invasion of Privacy Inquiry, headed by Rep. Cornelius E. Gallagher (D-N.J.), has been killed. It was best known for its hearings on the National Data Bank in 1966 and its hearings last year on the use of drugs to control hyperactive school children.

The Inquiry operated for six years under the House Government Operations Committee (Govop).

Early this month, the new Govop chairman, Rep. Chet Holifield (D-Calif.), canceled the Privacy Inquiry and the Inquiry on Consumer Affairs.

Holifield calls the change a reorganization. But Ralph Nader charged that Holifield had "abandoned the committee's responsibility for the problems of the American consumer."

Meanwhile Gallagher hopes that he is out of the privacy invasion picture only temporarily. He is continuing to push for the establishment of a Select Committee on Privacy, Human Values and Democratic Institutions, which could expand the work of the defunct panel [CW, Feb. 17]. The proposal is now being considered by the House Rules Committee.

Report Urges DP Review in U.S. Government

WASHINGTON, D.C. – A task force looking into long-range plans for automatic data processing in the Federal Government has completed a preliminary report calling for establishment of a Presidential commission to conduct a comprehensive review of ADP in the Federal Government.

A critic of the report told CW that the task force, while citing problems, offered no solutions other than the "traditional technique" used in Washington of appointing a Presidential commission "if you don't know what else to do."

The report will be considered by the interagency group concerned with data processing in the U.S. Government. The group spawned the task force unit.

Bill Would Give Long-Term Loans to Jobless

WASHINGTON, D.C. – A bill that would enable banks to make low interest, long-term conversion loans to unemployed technical people in amounts up to 60% of their former salary, or $12,000 a year, whichever is lower, has been introduced in the Senate by Sen. Edward Kennedy (D-Mass.).

"With these tax-free funds added to their unemployment compensation and other sources of income," Kennedy said, "(they) will be able to maintain their family responsibilities, while making the difficult transition from defense to civilian, socially oriented research and development."

Under the provisions of the bill, which has been referred to the Committee on Labor and Public Welfare, the individual aided with a loan will begin repaying it three months after he is reemployed at a salary rate equal to two-thirds or more of his previous salary. Repayment would be made over a 10-year period, including interest payments at 3%.

Ballot Counting in D.C. Election Gets a Hand

WASHINGTON, D.C. – The District of Columbia last week went back to hand counting ballots cast in Washington's election for a nonvoting delegate to the U.S. House of Representatives, won by the Rev. Walter E. Fauntroy – and there were no problems.

In a primary two months earlier, the district had attempted to use punched card ballots and IBM 083 sorters in counting the results. But a variance in width and texture of the cards caused the machines to jam and necessitated pressing 100 students into service to count the votes manually [CW, Jan. 20].

Connally Asks More Jobs, Funds for IRS DP

WASHINGTON, D.C. – Secretary of the Treasury John B. Connally has asked the House Subcommittee on Treasury, Post Office and General Government to approve an increase of 794 average positions and $38,936,000 over the level authorized last year for DP operations in fiscal year 1972 in the Internal Revenue Service.

All ADP equipment on lease in fiscal 1971, according to Connally's request, will be continued on a lease basis "except for those items on which lease credits would cease to accrue in fiscal 1972."

New Weapon May Get Traffic Fine Violators

NEWARK, N.J. – This city is pinning its hopes for more revenue on a computerized traffic violation processing system to help collect an estimated $6 million in fines.

The governor recently vetoed a measure designed to nab the violators. The bill would have given the state Division of Motor Vehicles power to refuse license and registration renewal of those motorists who ignored traffic summons.

But Deputy Police Chief William Codman said the department is pressing plans to computerize the system of processing traffic violations. The system would cost $1.6 million.

Soldier of the Month Wears Combat Boots?

FORT BELVOIR, Va. – A computer programmer has won the Soldier of the Month competition at the Army's Computer Systems Command, headquartered here.

SP4 S.L. Fitez was selected over four other contenders from company level units on the post, and wins a $25 savings bond as a prize.

SP4 Sharon L. Fitez is the first Wac to win the competition.

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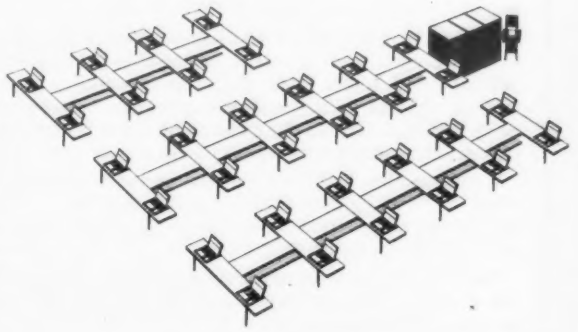

KEY-EDIT 100/100

The Incredible Reducing Machine that started it all.

This is the KEY-EDIT model that made Consolidated Computer a world leader in data input equipment. Introduced little more than a year ago, more than 100 KEY-EDIT™ systems are installed and working in cities throughout North America and Europe. And they're serving an equally diverse mixture of government, industry and business.

KEY-EDIT is known to these users as "The Incredible Reducing Machine" because it reduces data preparation problems to an absolute minimum. KEY-EDIT 100/100 combines all the advantages of the shared-processor with powerful editing and control features.

The KEY-EDIT 100/100 is now available with a variety of newly designed data stations with many optional configurations and new model colors.

KEY-EDIT 100/145

The Incredible Reducing Machine for communications and remote editing.

This communications-oriented addition to the KEY-EDIT™ family, with powerful control and editing features as standard, can be tailored to a variety of user processing needs.

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With a powerful editing and control processing capability, the 100/145 becomes a high-performance introductory system to large users for evaluation and specification development.

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The KEY-EDIT Series 100 Family

The KEY-EDIT Series 100 family of data preparation systems gives users a wide range of capabilities to meet the demanding requirements of modern computer operations. Systems features within the family allow the KEY-EDIT user to grow to larger models quickly and easily with no operating changes.

But KEY-EDIT users get more than a system. They get reliability. Reliable delivery. Reliable service. Reliable people.

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Washington, D.C.,
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Frankfurt and
Munich, W. Germany.

You can expect more from
CONSOLIDATED COMPUTER INTERNATIONAL INC.
World Leader in Data Input Equipment

Have We Got a Pastor for You!

NEW YORK – How can a congregation and the right pastor or priest find each other?

The answer to this question is the computerized Church Manpower System. Notification and official input forms are now being mailed to over 25,000 priests and pastors of three leading denominations and the National Council of Churches.

Beginning next fall, any congregation of the Episcopal, American Baptist or Lutheran Church in America that has a vacant pastorate may apply to its national headquarters data bank and receive personnel profiles on ministers looking specifically for its kind of parish.

The minister's input form now being distributed asks for a wide range of information, including name, address, birth date, education, work history, interests and skills.

This information will be fed into the computers of the various denominations and the National Council of Churches and each participant will then receive a printout so that he will be able to review and approve his own record.

Separate System

The system, designed by Information Science Inc., New City, N.Y., is programmed primarily in Cobol to operate on an IBM 360/30 (65K) under DOS. Each denomination will maintain its own separate, but compatible, computer system. While the denominations will use the same computer programs, each will maintain its own data base and control its own information.

A congregation looking for a new pastor or priest will get in touch with its judicatorial staff which will help it develop a description of its requirements, and a data bank search request will be made to the denomination's national headquarters.

The data bank will locate and return to the congregation the list of those clergymen who best match their needs. Personnel profiles will accompany the list.

Tax Time Again

IRS Computerization Pays Off

By Edward J. Bride
CW Staff Writer

ANDOVER, Mass. – There are two sure things in life, it is said, and they are death and taxes. Owing to the computer, the latter is becoming even more certain.

The April 15 filing date is rapidly approaching, and taxpayers are becoming increasingly aware that the computer makes an efficient tax collector, or at least an efficient secretary for one.

The tax filing form, the 1040, has been designed as an interface between the taxpayer and the computer, according to the Internal Revenue Service (IRS), the country's tax agency.

The form has been designed to reflect the tax laws and the citizen's financial status, and to facilitate the computerization process. At each of seven regional service centers, the 1040 is converted to punch cards and magnetic tape, and every tax return is checked mathematically by computer, with minor corrections made automatically.

The North Atlantic regional center is located here. It is the largest such facility by volume, processing some 18 million returns annually, and accounting for 22.5% of the tax revenue raised in the nation. The center services New York State and all of New England.

A Bit Noisy

The regional center is "people-oriented," IRS officials remind visitors. The keypunch room sounds like an April rainstorm, with about 800 IBM 024 machines banging away. The devices will be replaced starting the end of this year, when a Direct Data Entry system goes into effect.

Meanwhile, the millions of punched cards are processed by a Honeywell H-200 at each center, and magnetic tapes totalling 130,000 returns a day are sent by commercial airline to Martinsburg, W. Va., where the National Computer Center finalizes the reports.

The national center is computer-oriented, IRS noted recently. Its DP inventory is prodigious: five IBM 360/65s, a handful of keypunch machines and two microfilm printer systems.

The tandem of computer-microfilm units keeps the permanent tax records and assists in audits. An official recently reminded CW that "it takes an agent to perform an audit," the computer can only help.

Aside from being a major computer user, the IRS fosters the growth of the industry by treating DP users liberally. Businesses can file portions of their returns (forms W-2, 1099 and 1087) on magnetic tape, and can store business records on any media recognizable by machine, as long as this media is regularly used in conducting business.

In recent years, the agency has also ruled that computer users could treat their own software development costs as either expenditures or capital investments, whichever would benefit the user most, so long as he was consistent in his bookkeeping procedures.

While being in the forefront on certain DP ideas, the IRS has not gone to optical character recognition or mark-sense input. There is some use of magnetic ink characters, but mostly for internal audits or checkpoints.

The agency also will compute a taxpayer's taxes if he earns less than $20,000 and takes the standard deductions. Officials hesitate to predict any expansion of this program, even when three new regional centers are opened in the next two years.

Meanwhile the existing centers run around the clock, including weekends, during this peak period. The North Atlantic center has beefed up its staff from a normal staff of 2,400 permanent employees to the peak of about 5,600.

Bay State Tries to Change No.1 Ranking

BOSTON – First in the nation, per capita, in auto thefts.

Fifteenth in private property loss.

That's Massachusetts, according to FBI figures, but the computers are being put to work to solve the problem.

Although the lack of a title law has made the job of the heavily computerized Department of Motor Vehicles more difficult, especially in tracing stolen cars, a research company is studying the burglary problem.

The Analytic Sciences Corp., in nearby Reading, will be computer-processing crime information from several communities, including Boston, Lawrence and Lowell, using its own staff, plus police officers and research scientists.

The Winchester Police Department has reportedly devised a new burglary report form to assist in the research.

A spokesman for Analytic Sciences said the study should reveal more effective patrolling methods, better manpower allocation, and a higher burglar-capture rate.

Proposal Would Penalize Large Users of Electricity

By a CW Staff Writer

NEW YORK – The principle of bulk buying dictates a lower cost when you buy large quantities, right?

Not always . . . and not when electric power is concerned.

At least not if the anticipated power problems become a reality again next summer. A reversal in rate structures, penalizing heavy users of electric power, is one measure being contemplated by power experts, city and federal officials.

One proposal made to Consolidated Edison would have the utility give up its power generation and transmission facilities to the state, and leave just the selling or marketing of power to Con Ed.

But the single idea among the scores of "solutions" that would affect computer users is the one calling for penalizing the large users of electricity: those well-lighted, mechanized centers with controlled environments (air conditioning).

Another proposal would impose a moratorium on the building of new office buildings in Manhattan, particularly those with controlled environments.

Two officials of the New York power pool told a state hearing board that core areas of large cities, like New York, should be given preferential treatment when power-rationing measures were taken.

The officials, testifying at a State Public Services Commission meeting in March, said several utilities had taken "load shedding" measures to assist Con Ed last year, and that these measures would probably be needed again next summer.

Con Ed has reported reducing power by 3% an average of almost twice a month since the beginning of 1970.

The utility also reported 5% cutbacks 19 times, and 8% reductions three times. An intentional blackout last September affected about 30,000 residents of Westchester and Staten Island, the utility stated.

Con Ed officials have repeatedly stressed that businesses will be "the last to go" when blackouts are necessitated.

Minnesota Laws Kept in Check

ST. PAUL, Minn. – Housekeeping of state statutes has been greatly facilitated, thanks to the computerization of the bill-drafting procedure.

Like many other states, Minnesota has stored its four volumes of statutes on computer tape, under a program devised by Aspen Systems, of Pittsburgh.

Legislators and librarians are thus relieved of the burden of carrying around the bulky, heavy books. Fourteen video display terminals in the offices of the state Revisor of Statutes "bring" the books to persons requesting such information.

DP Students Show Business Acumen

By Phyllis Huggins
CW West Coast Bureau

WALNUT CREEK, Calif. – A new computer service firm in operation here is not like most firms because it is staffed entirely by high school students.

Compcorp is an enterprise with two customers who have given the company open purchase requests. The firm is now looking for business from real estate agents to compute mortgage breakdowns and engineering firms which may need operations research efforts.

"It's a little frightening," says instructor Tom Bown. "In a few weeks these students outdistance the instructors and are capable of higher-level mathematics."

It all began about two years ago when the computer program at San Ramon High School was set up with an advisory committee headed by Dr. Sidney Fernbach, head of the computer laboratory at Lawrence Radiation Laboratories.

At his recommendation, Basic was selected as the language to be taught. The school got a Data General Supernova computer on a lease-purchase arrangement, and three teletypewriter units used in time-sharing are in the classroom. Bown says it takes only six weeks of teaching Basic and the students are quite competent.

The programming course is the first step. After that, the students can elect to take the Compcorp class. There are now 18 students in Compcorp and the class is organized as a business with students serving as manager, department heads, systems analysts, controller, assistant manager and secretary.

They decide what programs they will develop and approach local businesses to sell their services. It's not a give-away service but a money maker. After costs are taken out, they split equally with the school district. Last month the payroll for each student was $6.

Learning business know-how is not the only advantage for the students. Paul Salsgiver, last year's Compcorp manager, graduated and enrolled at Chico State College where he passed the programming exam and was put directly into the senior programming class.

DPMA has taken an interest in the high school endeavor and on March 20 the Valley Chapter held a one-day symposium for the young programmers with all high schools in the area invited.

Compcorp's customers are happy. According to Dexter Dawes, director of finance for Applied Radiation and a customer of Compcorp, "I view it as a straight business proposition – a very excellent value for the money."

Museum Collection Computerized

NEW YORK – The Museum of Modern Art has become the first museum in the world to computerize its entire collection. The computerized inventory contains indexed descriptions of 26,000 paintings, sculptures, drawings, prints, posters, photographs, design objects and furniture acquired by the museum since its founding in 1929. It is the most complete collection of 20th century art in the world and includes work by thousands of artists.

The index is part of the Museum Computer Network, with headquarters in The Museum of Modern Art. The network is a consortium of museums committed to computerizing their inventories within the network system with a view to the eventual pooling and easy exchange of data. When a large enough body of information has been transcribed and merged into a single data bank it will aid museums and scholars in locating otherwise unpublished materials pertinent to any research or exhibitions using museum objects.

The network insures that all files remain technically compatible and saves institutions the cost of writing their own programs. Membership in the consortium includes 27 institutions throughout the U.S., five of which have begun to computerize their holdings.

T/S System Used In Public Health Protection Plan

PALO ALTO, Calif. – A remote computing and communications system is being used to safeguard public health by the Clinical Instruments Operations of Beckman Instruments, Inc. in Fullerton, Calif. Beckman uses the Tymshare system to help monitor the accuracy of its DSA-560 Discrete Sample Analyzer before delivery to the customer.

The DSA-560 performs wet chemical analyses and is usually used by hospitals and laboratories to analyze blood samples.

During final testing, each unit analyzes a known liquid sample and gives the results of its analysis in the form of a punched paper tape. The data is then fed into the system and is evaluated by a special program. Any deviation from the known standard is pointed out, telling the quality control people just what component within the unit requires the adjustment.

Editorial

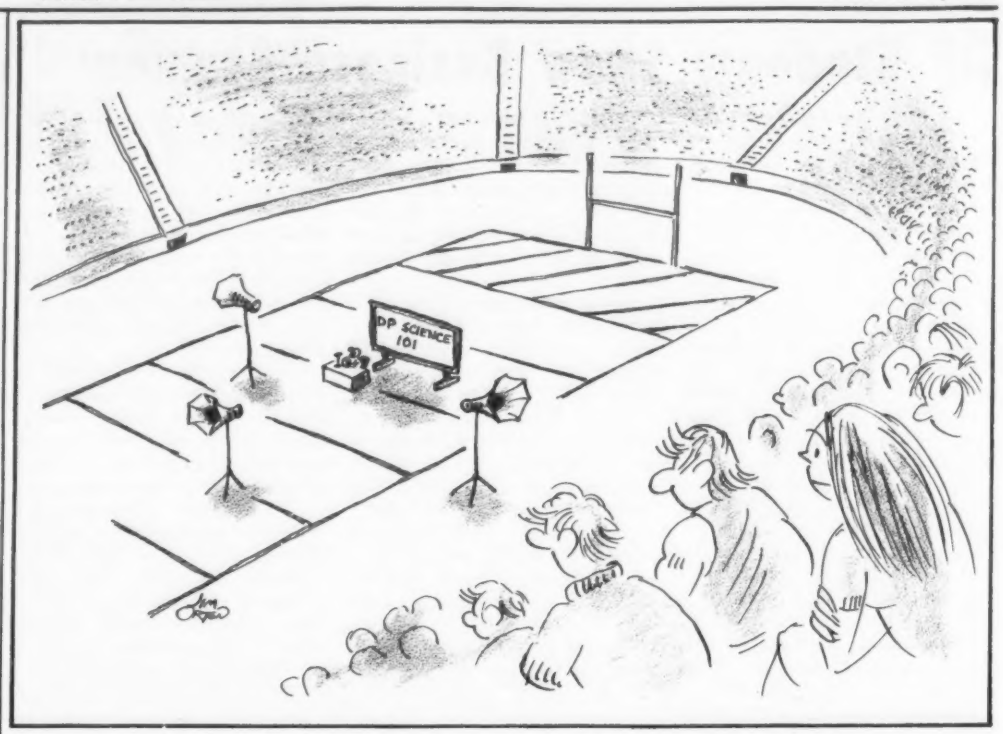
Root of the Problem

Probably the most damaging belief "taught" by the American education system is that 75% is a passing grade.

In the real world, a person who is right only three-fourths of the time is useless to most employers in most situations.

This is particularly true in data processing, where being right 99% of the time often isn't good enough.

It's certainly a point worth touching on when indoctrinating people to a DP operation. You'll be surprised how many people never thought of it before.



'Your First Assignment Is to Rewrite the Class-Scheduling Program to Fit Our Computer.'

Data Bank Tribunal, Inspectorate Would Oversee Control of Personal Data in UK

D.C. Data-Line
By
Alan Drattell

WASHINGTON, D.C. – After nearly four weeks of hearings before the Senate Subcommittee on Constitutional Rights, there is little doubt that some control and policing of data banks are needed to preserve an individual's right to privacy.

Sen. Sam J. Ervin Jr. (D-N.C.), chairman of the subcommittee, speaking on the floor of the Senate, summarized his reasons for conducting the hearings. "No one is interested in turning back the clock on technology," he said, "but only in seeing that this technology is not used as a tool by the government to invade an individual's privacy . . . (and) no one is interested in denying the government the right to collect information it needs for legitimate purposes, including the enforcement of the laws, but only in denying the indiscreet and indiscriminate gathering and use of such information."

A great deal of advice was given in the plethora of oral and written testimony presented to the subcommittee. And one of those individuals presenting evidence, Leslie Huckfield, a Member of British Parliament, told the senators about a privacy bill he had introduced recently in the House of Commons.

Huckfield's legislation might well serve as an important and illuminating starting point for developing a bill suited to the American environment and needs.

Called the "Control of Personal Information Bill," it provides "a comprehensive framework for the operation and development of data banks of personal information." It aims to set up a data bank tribunal and an independent inspectorate.

"The tribunal will grant licenses to operators of data banks upon terms and conditions suitable for their purposes, but not so as to infringe the right, created by the bill, of the individual to control the collection, storage and use of information about him," according to Huckfield.

Licenses

The tribunal will be composed of five lawyers and representatives with qualifications based on knowledge or experience in "management, industry, commerce or the use of computers."

The tribunal will have the power to order the correction of any item stored in a data bank about an individual on the grounds of "inaccuracy or incompleteness or irrelevance regarding the purpose for which the information is stored," and also that anyone who has been told the incorrect information shall also be told the correction.

"Provision is also made," according to Huckfield, "for that category of information which it is perhaps better that the individual does not see, including medical and police data. In this case the inspectorate is charged with the duty of checking for accuracy."

'Audit Trails'

In his testimony before the subcommittee, Huckfield said, "I believe that the installation of scrambling machines and devices should also be studied further, so that viable forms of access control and audit trails can be established. Any installation and development or technical safeguards will obviously be costly, but this is a price which society must be prepared to pay to maintain its accepted norms of behavior."

Under his bill, the ultimate responsibility for licensing and for enforcement of such safeguards will rest with the inspectorate and the tribunal, who, he said, "must be allowed to develop flexibly in a field where there may be few precedents or guidelines."

Tradition Rules

There are examples of control and enforcement, Huckfield said, concerning files in other countries. "In France and countries whose legal framework rests on the Code Napoleon, there is the tradition of the 'fiche.' This is a file kept permanently on each individual citizen from birth to death, at the local police station. When the citizen moves, he must give notification and his file moves with him.

"There is also the precedent set by Sweden, with its long-standing constitutional right to public examination of any file which is in the state's custody. This includes personal data on income, marital history and other basic census information."

Huckfield, adding that the privacy problem is becoming increasingly international in scope, said that his bill "makes provision for remote terminal access to data banks operated outside the UK – surely very relevant in these days of international airline and hotel reservation systems, and international personnel files."

'More Experience'

He then told the subcommittee, "in legislation against intrusion upon privacy by unwarranted publicity and by surveillance techniques, you have more experience than in Europe.

In legislating against the intrusion of the dossier, the ensuing institutional battle between the individual and the needs of the community and society is also perhaps more advanced in the U.S.

"We have noted that your problems usually become our problems two or three years later. We have seen this with inflation, urban problems and pollution. This is why we can learn from your experience and perhaps your early mistakes."

Letters to the Editor

'DPMA Is Trying!'

John Seitz's letter in the March 17 issue demeaning the DPMA Certificate in Data Processing, perhaps involuntary, expresses a concern of many DPMA CDP holders.

That concern is how the CDP examination, or something else to replace it, can be made a more valid, effective evaluation of an individual's qualifications in the field of data processing.

As a CDP holder (and proud of it, I might add) I take exception to attempts to demean the program by stressing weak points (which I readily concede) without also enumerating the many strong points.

The letter begs an obvious question: when will such organizations cease their destructive, know-it-all criticism and come forth with a positive method of self-policing, designed to eliminate the charlatans, the incompetents and the deliberately disruptive people presently so prevalent in the DP field?

To its eternal credit, DPMA at least is trying! The CDP examination, conceived as a way to develop the groundwork for a future licensing procedure somewhat comparable to that of the Certified Public Accountant, may not be the best answer to the validation problem, but until someone comes forth with a better one, please let the "do nothing" people who "know not that they know not" be silent!

George J. Vogel, CDP
Past President
Milwaukee Chapter DPMA

Muskego, Wis.

Volt Lives in N.Y.

In your March 3 issue you discussed a Jamaican key punching firm being awarded a contract by the City of New York. Volt Information Sciences is the prime contractor based in New York City. Compuentry, Ltd., is the Jamaican firm owned by International Compumedics Corp. of Princeton Junction, N.J.

Don Iverson
President

International Compumedics Corp.
Princeton Junction, N.J.

Reader Comments On Taylor 'Report'

In your March 10 column I wish you had reproduced the actual student grade report so I could see the type. I suspect that it was produced on a #407 printer from cards. The cards could have been either original keypunched ones or produced on a #604 calculator to arrive at averages. It's possible that no "computer" was involved.

If from original cards, the Y could have resulted from a keypunch error where the operator trying to key a digit "1" hit the key to the left of it which is "Y."

Another hypothesis is that he was given an "8" for withdrawing from the course, the #604 correctly did not give credit for the course (only three units appear in the semester unit box), and the 604 then overpunched the "8" with a zero making a Hollerith "Y."

As I remember the old war horse, you can wire a 407 to remove zone punches but this would not have been done for that print position since alpha as well as numeric must be printed there.

What I'm trying to say then is that the error could have been due to failure to key verify . . . or overpunching with the calculator punch . . . but not a "computer program error." For a future subject how about all the designers who produce subscription blanks, etc. and do not seem to know that typewriters space vertically at six lines to the inch? That's one of my pet peeves. I always have to use the vernier knob to line up successive lines.

Jerry Fraenkel

New York, N.Y.

A Bill Should Be Payable, and the Codes Meaningful

The Taylor Report
By
Alan Taylor, CDP

One of the beautiful things about a good standard is that it will be simple.

W. Leon Sanford Sr., commenting on the Master Charge billing system, said: "Perhaps the systems analyst made only one mistake . . . he forgot that a bill should be payable." This particular point was very appropriate. Sanford was setting a standard so that systems which produced so-called "bills" that simply did not have the necessary information on them could be condemned, and at the same time, setting a quality standard which said that anything that appeared on the bill, and which was not necessary and could therefore impede understanding, should be removed.

Two very good points. If the Master Charge system had considered them it would not have issued bills that did not add up to the charge made. Clearly a bill which is not arithmetically complete and accurate is one which a receiver does not pay promptly.

Moreover, if the programs had been designed so that details of charges were not present would not merely clarify the document for the recipient, and would make it more payable, but also would make room for special cases to be handled in a way that can be understood.

But, in fact, the Sanford standard can have particular meaning in cases similar to Richard P. Tritter's as shown in Figure 2. This is a perfectly understandable bill. As it says (or would say if the punched holes had not got in the way of the lettering) it is a final notice of payment due. No one can mistake that.

Except for one little point – there is no payment due! Tritter explains, incidentally in a letter to his senator, that he received this bill after he had left Massachusetts and gone to live in California. While in Massachusetts he had been covered by his firm in the Massachusetts Blue Cross-Blue Shield. When he left, the Blue Cross-Blue Shield, wanting to enroll him, first sent him a bill which, on close examination, could be considered actually not a bill but a solicitation, and then followed it up with this demand!

Talking to Blue Cross-Blue Shield people, I found that they saw nothing particularly wrong with this procedure. "He can just ignore it, if he does not want to join" was their reaction.

Now, examining the bill from the standpoint of the Sanford standard rule it is clear that it is not simply payable. It is, legally speaking, an offer which is acceptable, but there is no payment due. Under the rule then, this piece of computer output would be rejected.

Aggravations Are Bad Systems

Personally I also think it should be rejected because it caused Tritter to get annoyed with the computer system – and we do not want people unnecessarily getting annoyed with computer systems. I think it should be rejected because it pretends to be one thing when in fact it is another. That type of untruthfulness is not the type of standard that we should let the computer profession be associated with.

I think the Sanford standard is an excellent one. I have not been able to think of a more generalized version, dealing with other documents. If a bill should be payable, should a report be informative? Or should it be reliable? There is a world of difference between the two, and when a credit bureau issues a report, I am not certain which is the upper extension of the Sanford rule. Perhaps readers will have some ideas.

Another very valuable rule came in from Stewart K. Winstandley. He brings up the use in the Arizona State University report card of numeric coding when informative coding could be used.

And he says that "coding, wherever possible, should be intuitively meaningful." Now that is a good rule as well. I cannot see any reason why "M" for male and "F" for female (which are intuitively reasonable) should not be good codes anymore than I can see any reason why State Farm should use "A, B, C, D, E, F" for its coded outputs.

They do, and at least one reader, Judith M. Jack, has sent a recoded version to Everett O'Brien senior vice-president of State Farm Insurance companies of Bloomington, Ill. She suggests that one way we have of getting rid of these horrors from the computer scene is for us to bombard people quickly.

So, there you have two rules and one possible action. Why don't you check your outputs, and the ones that you receive, against the rules – and if they do not measure up – then send me copies. If you have constructive suggestions, send them also to the firm concerned.

...But the Arrogance Continues

Meanwhile the arrogance of computer output continues unabated. In March the *Federal Times* reported that the Civil Service Commission had used a bad computer program, and, as a result, some of the deduction totals were wrong on the employee income tax forms.

David F. Williams, director of the Civil Service Commission's Bureau of Management Services, sent out a letter saying, "It has been discovered that some of the statements of deductions contain inaccuracies, others are correct . . . . You are requested, therefore, not to use the figures shown on the statement for income tax purposes without first verifying their accuracy.

This can be done by checking against your earnings and leave statements which were furnished with each biweekly pay check."

He then went on to explain the reason that corrected forms will not be sent out saying, "We do not plan to reissue corrected statements for the 1970 year because of the time factor and the pressure of other demands on the total automated system."

What he is really saying is that for every deduction, each civil servant is supposed to find (or get copies of) 26 pieces of paper – probably copy down 26 numbers from one piece to a consolidated statement, and then add them – a total of 53 manual actions per deduction! In the meantime the pay officers will be asked for copies. And all this manual work is to be done just because Management Services made an error, and now cannot be bothered to take the responsibility of correcting it, but instead leaves it to humans!

Letters to the Editor

Coding Should Be Intuitively Meaningful

I would like to make a few comments on your article in the March 10 issue. I agree that we need to check the validity of printed output, but your discussion tends to indicate that we should wait until the final run before this is done. In the systems with which I have worked, there is always more than one program. For grade reporting, the grades are sent in by class.

They must then be loaded on tape and sorted by student for the grade report. Therefore the checking should be done by the program that reads the original input data, and not during the creation of the printed data.

Incorrect data can be checked, corrected and reloaded before the necessary sort, and the messages you suggested would not be necessary. Your messages would create more problems than would be necessary.

Printed on the grade report form was the type of data to which I object since it can be changed for general consumption. An example is the "1" shown as the sex, and the "13" shown as the college code, with instructions to see the reverse side for the codes. Why can't such codes be changed to meaningful abbreviations such as "M" or "F" that a person can intuitively understand?

Stewart K. Winstandley, CDP
Assistant Professor of EDP

Eastern Kentucky University
Richmond, Ky.

Readers' Rules Would Catch Errors

Crib and Dy-Dee
SERVICE
4812 MINNESOTA AVENUE, N.E.
WASHINGTON, D.C. 20019
PHONE (202) 396-6600

RETURN THIS PORTION WITH YOUR REMITTANCE TO INSURE PROPER CREDIT

CODE
13. MISC. CREDIT
14. VACATION CREDIT
15. VACATION CREDIT
16. ADJUSTE
16. ADJUSTMENT CREDIT
17. GIFT CERTIFICATE CREDIT
19. 1ST TIME CHARGE
20. REG. WEEKLY CHARGE
21. INSTALLATION CHARGE
22. HAMPER CHARGE
23. SPECIAL DELIVERY CHARGE
24. EXTRA DIAPERS CHARGE
25. VACATION DIAPERS CHARGE
29. DISPOSABLE DIAPERS CHARGE
30. MISC. CHARGE

CUSTOMER NUMBER	PREVIOUS BALANCE	CHARGES DIAPERS	CD	MISC.	CD	SALES TAX	CREDITS PAYMENTS	MISC.	CD	CURRENT BALANCE		AMOUNT DUE
J3 212443		3.70	20							3.70		14.80
												PLEASE PAY THIS AMOUNT

When not at home, please put your bundle out.

MAIL TO	
DELIVER TO	KUCH TERE 7554 SPRINGLE D WASHINGTON DC

DELIVERY 12/09/70 TO IMPROVE SERVICE
MAKE ALL REQUESTS ABOUT YOUR ACCOUNT TO YOUR ROUTEMAN. THANK YOU.

Figure 1. A bill issued which does not add up arithmetically. According to the Sanford standard such an item would be rejected as not being payable. (The "bills" have been reset from a copy, for clarity of reproduction.)

BLUE CROSS *BLUE SHIELD* 133 FEDERAL ST., BOSTON, MASS. 02106 TEL 262-5500 AREA CODE 617

CERTIFICATE NO.	PERIOD COVERED FROM	TO	
5613521	10-10-70	01-10-71	990000340

FINAL NOTICE OF PAYMENT DUE

TRITTER RICHARD P
10 HAMMOND POND
NEWTON MASS JAN 5 71

JAN 5 71

$37.69
You must pay XXXXXXXXXX
on or before DEC 27 1970
to avoid cancellation of your XXXXXXXXXX
membership. 0191040405
708128
(See other side) 708128

THIS NOTICE MUST BE RETURNED WITH YOUR PAYMENT.

IF YOU ADDRESS IS DIFFERENT, CHANGE IT ABOVE..... ☐ PERMANENT ☐ TEMPORARY UNTIL 0

379 (2-68) C25460-S

Figure 2. A bill issued where no liability exists. This was issued to Tritter simply as a means to allow him to join Massachusetts Blue Cross-Blue Shield. It also is not a liability, and by an extension of the Sanford rule should be rejected.

State Farm Life Insurance Company

FILE 70-94-002
INSURING: ELLIS A JACK
POLICY NUMBER G02-1852-919

YOUR RECORD OF PREMIUM PAYMENTS AND CREDITS

DATE FEB. 24, 1971
AGENT 28-1060
POLICY NUMBER G02-1852-919
PREMIUM ANNIVERSARY MAR. 11, 1971

INSURING: ELLIS A JACK
$20,000 EXECUTIVE PROTECT
WPD AD

*	AMOUNT	*	AMOUNT
X	4.60		
Y	4.60		
A	27.80		
B	1.39		
C	34.80		
D	63.99		

ELLIS A JACK
P O BOX 383
VERDI, NV 89439

2-33-1720.3 REPORT ANY CHANGE OF ADDRESS ON REVERSE SIDE.

Figure 3. A record of payments and credits issued by the State Farm Life Insurance Co., which defines dividends, interest and other amounts by arbitrary codes. According to the Winstandley standard, the codes would have to have some meaning, with OD standing for old dividends.

Data Bank Control

U.S. Regulatory Agency Needed

By Joseph Hanlon
CW Staff Writer

The Assault on Privacy – Computers, Data Banks, and Dossiers by Arthur R. Miller, The University of Michigan Press, Ann Arbor, 1971, 333 pages, $7.95.

A new federal regulatory agency empowered to make rules in the computer-privacy area is the best answer to the complex problem of data bank control.

This is the conclusion of Arthur R. Miller, University of Michigan law professor.

Miller feels that the problem is too involved, technically and politically, to expect detailed regulations to be passed by Congress in the "foreseeable future."

In his book, Miller cites numerous examples of rapidly proliferating data banks and discusses the impact of expanding computer technology, particularly time-sharing and data transmission. The book also details the legal foundations and current law of privacy, and how present law often fails to apply to computers.

Congressional action is unlikely, Miller declares, because "our very limited experience with data centers and computer networks" makes it almost impossible at present to draft legislation "that will stand up under the pressure of rapid technological change."

At the same time, he feels "the vast majority of congressmen have little or no comprehension of the new information technologies, much less their broader implications."

Under Miller's plan, the new agency would have a three-part function: make rules regulating data banks, educate people as to the problem, and serve as an "information ombudsman" to correct abuses.

Before actually setting up the regulatory agency, Miller suggests a "Study Commission on Informational Privacy to lay the foundation for such an agency." Miller notes that Rep. Cornelius Gallagher's proposed Select

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Committee on Technology, Human Values and Democratic Institutions would serve this function.

Harsh on Westin

Miller argues there is a need for "entirely new legal principles that might be better tailored to the unique aspects of the computer privacy problem" and he is critical of attempts to bend the present legal structure to solve the problem.

He is particularly harsh with proposals by Prof. Alan F. Westin, director of the National Academy of Science's Project on Computer Data Banks and author of *Privacy and Freedom.*

Westin has proposed that personal information be considered a form of property, with the same rights of control that one has over real property.

But Miller declares: "To struggle with the metaphysics of bastardizing the rules relating to the ownership of automobiles and land in order to apply them to computerized data is a dubious venture indeed, because they have nothing in common . . . [U]ndue reliance on the property approach might tend to abort attempts to pursue more fruitful avenues of legal control."

Self-regulation could be particularly useful, Miller contends, because only those within the industry are likely to be able to "provide a sufficiently elaborate and forward-looking set of principles to govern the wide variety of situations in which computer personnel are called upon to handle personal data."

"It is questionable," Miller continues, "whether the atmosphere in the computer science field is congenial to self-regulation. This doubt is especially significant because a meaningful code of ethics almost certainly would require the elimination of particular activities that currently are in vogue."

Self-regulation is also inhibited because "too many information handlers seem to measure a man by the number of bits of storage capacity his dossier will occupy. This climate is not conducive to enlightened self-restraint.

"For the foreseeable future, the key to effective governmental activity in the computer-privacy area will be to maintain sufficient flexibility and resiliency to adjust to the constant changes that characterize our technological and social environment." Such flexibility, Miller contends, can only be maintained by a regulatory agency.

Without regulation, Miller warns, computer data banks will develop into a "record prison" – a "comprehensive womb to tomb dossier on every individual" which would be transmitted "to a wide range of data users over a national network." The most serious danger of such a prison is "that people may increasingly base their decision and fashion their behavior in terms of enhancing their record image in the eyes of those who may have access to it in the future."

'Basic' Text Geared to High Schoolers

By Paul F. Hultquist
Special to Computerworld

"Basic Basic – An Introduction to Computer Programming in Basic Language" by James S. Coan, Hayden Book Co., 1970, 256 page, $7.95.

In a way the name belies the book – it isn't entirely a matter of how basic one can get, but how far one can go with Basic, particularly with a high school audience.

Almost all of Basic is covered thoroughly and lots of other things besides. What probably motivated the writing of this book, as well as many others of its genre, was the desire to put a little more fun into mathematics while teaching something about computing and computer algorithms to high school students.

It appears to be a better than average attempt at this, and if the user can stand the thought of studying a high school text, it might prove to be a successful text in a college or adult education course. With a little help on how to run the terminal it could be used for self study.

The introduction to Basic is basic indeed. To slay the dragon of I/O early in the game – which is the way to do it in Basic – the author starts with such simple programs as "PRINT 23.4*91" and "END." As each new instruction is introduced there is a thorough discussion with numerous examples.

It is a well written book and ought to be successful at doing what it purports to do. There are many good examples, complete with results; these programs are all tabulated in an appendix with descriptions and page references.

Paul F. Hultquist is assistant dean and a professor of electrical engineering at the University of Colorado.

Random Notes

Software Houses Offered Sample Employee Pact

SAN FRANCISCO – A sample legal agreement for the protection of proprietary programs within a software house is available at no charge from Financial Timesharing Services Inc. (FTS).

The agreement defines in detail the responsibility of an employee to protect the interest of his company. Every key employee who has access to, or is closely associated with, the development of marketable software should sign the agreement, FTS said.

Companies that use the agreement are said to gain another advantage beyond the obvious one of letting employees know what is expected of them. Investors and potential investors should be more willing to back a developer concerned enough about his product to try and protect it in this way, FTS claimed, from 645 Battery St.

Polymorphic Can Adapt Basic Compiler to Minicomputers

PALO ALTO, Calif. – A generalized Extended Basic compiler, interpreter system, that can be adapted to small- or medium-scale time-sharing minicomputers, is being developed by Polymorphic Corp.

A superset of the Dartmouth Basic, the Polymorphic processor provides extensive character string manipulation functions. String compare operators are available, as are arithmetic, relational, logical and string operators. The system also permits dynamic storage of strings and arrays.

Cost of the Basic processor, supporting a "reasonably rich" language, is approximately $30,000. Adapting the system to a particular minicomputer requires four to six months, the company said, from 460 California Ave.

Linear Programming Systems Added to Axicom T/S Net

PARAMUS, N.J. – Linear programming capabilities have been added to the Axicom System time-sharing network with the installation of the Functional Mathematical Programming System (FMPS) and a companion system known as Gamma 3.

Developed by Bonner and Moore Associates, FMPS will solve problems as high as 8,040 rows. It can provide right-hand side ranging, greatest upper bounding, mixed integer programming and separable programming. The system also has capabilities for handling nonlinear and postoptimal procedures, Axicom said. Gamma 3, another Bonner and Moore development, facilitates the building of input models and report generation for FMPS. Users are charged at standard Axicom usage rates, from 615 Winters Ave.

Folio III Studies Investments

ST. LOUIS, Mo. – Folio III, a series of programs developed by Trident Financial Services Corp. for portfolio managers, is available on the ComShare nationwide time-sharing network.

The programs provide current pricing and dividend information on securities traded on the New York and American Stock Exchanges. The user can create a client's portfolio and then post transactions to it. Account evaluations can be generated through the system, Trident said. The firm is at 230 South Bemiston Ave.

Three-Part PHI System

Mini Controls System 360 Teleprocessing

By Don Leavitt
CW Staff Writer

ARLINGTON, Mass. – The Telecommunications Programming System (TPS) from PHI Computer Services Inc., is a complete program management facility which allows the OS/360 user to control a teleprocessing network through a minicomputer. With TPS, the user can manage the interfaced mini as though it is a native IBM hardware subsystem, PHI said.

TPS consists of three basic subsystems. A Communications Access Method (CAM) provides the 360-resident support for the user's application programs, and controls the message streams through the multiplexer channel to the mini that is serving as a communications processor.

The Communications Processor Programs (CPP) reside in the communications mini and control the message streams in the external teleprocessing network.

The Communications Program Generator (CPG) provides, within the 360 or 370, the facilities for generating and maintaining the CPPs, even though they are executed in the communications mini.

Under CPG, the user is able to build programs for the mini, using standard IBM facilities and the macro processor or an assembly capability. The macro processor allows the user to state his logic without becoming involved in the machine language coding of the mini. The assembler facility allows him to code in the mini's assembler language even though the program is being developed on the 360.

Communications programs developed under CPG can be cataglogued and maintained on the standard IBM program libraries, and, upon command from the 360, can be loaded directly into the minicomputer from the library.

The minicomputer can be used to emulate an IBM 2700 series transmission control unit, or to serve as a front-end preprocessor. The PHI CAM can replace the standard IBM access methods, BTAM, Qtam and Tcam, for non-emulation applications. CAM requires 9K bytes of 360 storage and includes high-level language interfaces which allow programs to be written in Cobol, PL/1 or Fortran.

TPS has been implemented using a Tempo 1 16-bit minicomputer as the front-end to a 360. The system can be modified to make it operational on any 16-bit mini, the company said.

Price of TPS depends upon the configurations of both the minicomputer and the 360 or 370 to be used. For non-Tempo 1 installations, price should range between $20,000 and $30,000 for CAM, and between $30,000 and $40,000 for CPG. The Tempo 1 versions, since they have already been developed, will be markedly less, the company said. The CPP portion of TPS is, of course, generated by the user through CPG. PHI Computer Services Inc. is at 800 Massachusetts Ave.

Programs Use Records Directly From Sort With Boothe Package

LOS ANGELES – IBM DOS/360 users can cut down on time and effort at both ends of sort operations with the Sortexit package from Boothe Resources International.

It allows users to have direct card input to the IBM Sort/Merge program 360N-SM-483. Sortexit allows application programs to receive input directly from the sort.

The package eliminates the preliminary card-to-tape/disk utility which runs only in the background partition. This saves the execution time of the utility itself, and the transition time between the utility and the sort.

By interfacing between the sort and the application program, the Boothe package allows a partial overlapping of the two operations not available under conventional sort processing. It gains this advantage, however, at the cost of losing the sorted data set that would be the normal output of the sort.

The data set can be recovered, Boothe noted, by modifying the application program to copy the records as they are received from the sort. Assuming the user program is preparing a printed report, the copying would be overlapped with the printing.

The direct card input to the sort is gained through a CALL to the Sortexit input module at one of the standard IBM-provided exits in the sort program.

Sortexit may be included in a user's Assembly Language program by specifying MODNAME=SORTEXIT in the DTF for the file normally reading the sorted input file.

Otheriwse, insertion of a CALL "SORTSET" in place of the OPEN normally used for the input file, or changing the Sortexit name to the name of the logic module used for the sorted input file will accomplish the same thing, Boothe said.

The Sortexit package requires less than 2K bytes of memory under DOS/360, and sells for $850. The firm is at 3425 Wilshire Blvd.

Minicomputer Applications Mart Has PDP-8 'Performance Paks'

CAMBRIDGE, Mass. – Users can get software packages, peripheral devices, and hardware interfaces and multidisciplined technical support through the Minicomputer Applications Mart, opened here recently by Input Output Computer Services (IOCS).

Aimed largely at the DEC PDP-8 series, the Mart provides individual application packages or complete turnkey systems. Also available are performance paks, which include software, peripheral equipment and, when needed, the hardware interface for the PDP-8.

One of the Performance Paks is designed for the Graf/Pen graphic data input device from Scientific Accessories. The associated Anagrafic software to reduce data from the pen, and the PDP-8 hardware interface, were developed by IOCS.

The Graf/Pen uses a spark-gap and microphones around the edge of a data tablet to fix the location of data being entered. The Anagrafic software checks the impulses from the microphones for acceptability based on user-defined limits, digitizes the data and stores it in the computer. The basic Anagrafic software does not provide data analysis, but additional modules are available for this capability, IOCS said.

Output from the PDP-8 is normally on punched paper tape or printed on the teletypewriter terminal. The basic system can be expanded to operate with magnetic tape, disks, and X-Y plotters.

The 4K PDP-8 required by the Anagrafic system cannot be used for anything else while the graphic application is being run, IOCS said.

The Anagrafic Performance Pak is available for $7,500. The turnkey system, including the PDP-8, is priced at $17,500. Input Output Computer Services is at 138 Mt. Auburn St.

'Super/Sim' Speeds 1401 Use

WESTPORT, Conn. – Users who need to run 1401 programs under OS/360 can speed the whole process and cut operator intervention with the Super/Sim, software simulator package from Hygain Technologies Inc. The package gains its efficiency by spooling printer output, by allowing the operating system to allocate tape assignments and by "automating" the handling of simulator commands.

The 1401 Super/Sim is said to support all standard 1401 features, and advanced programming, sense switches, and tape support. The move record, multiply/divide and expanded print edit instructions are also available with the package, as is a 1311 disk storage compatibility feature.

The package simulates the 1403 printer carriage tape to allow the printer on the 360 to operate at maximum speed. The capability of preparing additional copies from the spooled records, part of standard OS, is available to the 1401 programs as well, with Super/Sim.

The Hygain simulator executes 1401 programs under control of PCP, OS/MFT and OS/MVT. The simulator also operates with the HASP LASP and ASP packages.

The TAS command has been modified to allow OS instead of the operator to allocate tape data sets to any available drive. In addition, a "programmed operator" feature allows commonly used simulator commands to be entered through punched cards, as part of the job stream. This is not only faster than having the commands entered manually, according to Hygain, but avoids the possibility of error.

Super/Sim requires a maximum of 80K bytes of core, including the 1401 program being handled. Super/Sim is owned and maintained by a major university. The source tape and documentation are available from Hygain for a one-time charge of $475. The firm is at 65 Whitney St.

OLS Speeds Fortran Compiles

PITTSBURGH, Pa. – A more efficient Fortran compiler, on the On-Line Systems time-sharing network, can reduce compilation costs by as much as 25%, according to the company.

The new compiler is functionally transparent to the user. It optimizes the compilation process itself and produces completed program faster than previous compilers. On-Line Systems is at 4721 McKnight Road.

WU to Allow Private Line Ties

By Don Leavitt
CW Staff Writer

WASHINGTON, D.C. – Private line data users leasing facilities from Western Union will be able to interconnect with other private line networks if the Federal Communications Commission approves a tariff amendment recently filed by WU Telegraph Co.

The proposed changes in WU's tariff 254 would permit interconnection of user-provided units in the same manner as comparable interconnection regulations contained in AT&T's private line tariff 260.

The interconnection must be made on the user's premises, according to the tariff, but it may be by acoustic or inductive, or by direct electrical connection.

For networks which operate in excess of 150 bit/sec there is to be a minimum protection criteria to safeguard the Western Union system and equipment. This can be met, the company said, by an appropriate data set, provided by either WU or the user.

Minimum protection procedures for systems utilizing speeds lower than 150 bauds will be developed and announced at a later date. Until then, protection will be provided by WU as part of the terminals.

Scheduled to go into effect on April 7, the proposal applies to all private line communications systems, including data, teleprinter, facsimile and voice networks. It would allow, for example, the link-up of networks previously organized by Bell system carriers and WU, so that a data user might have company-wide capabilities without disturbing his existing communications lines.

TCTS Plans Digital Net

OTTAWA, Ontario – Canadian computer users will be able to transmit greater quantities of data, at higher speeds via a nationwide digital data network to be built by the Trans-Canada Telephone System (TCTS).

TCTS plans to start building the network this summer, linking Ottawa, Montreal and western Canada.

The ultimate design, and cost, of the total network will be determined by the evolution of technology and future data requirements of computer communications users, TCTS said. Installation of the digital network is a natural development since the company already has "significant digital facilities."

The new digital data network supplements the high-speed Multicom analog-based data service announced by TCTS late last year.

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RCA Files Satellite System Plans

NEW YORK – RCA has applied to the Federal Communications Commission for authority to establish and operate a domestic communications satellite system. The application was filed by RCA Global Communications Inc. and RCA Alaska Communications Inc.

The system could begin operation as early as 1974, RCA said, and it would ultimately include three satellites and 13 earth stations across the continental U.S., Hawaii and Alaska. Nine more earth stations, and 23 television transmit/receive stations may be added later. The satellite system could cut rates for private line, digital and analog data transmission by 50% or more, according to RCA.

GE Diginet 160s Multiplex Mixed Speeds

LYNCHBURG, Va. – The Diginet 160 series of private line data multiplexer systems, from General Electric Co., allows users to intermix channel speeds so that both high- and low-speed equipment can be used within a network.

Diginet 160 channels are totally transparent to data codes and are available with speeds of 110, 150, 300 and 600 bit/sec. Correspondingly, 17, 12, 6 and 3 Diginet 160 channels can be carried in one voice-grade circuit, GE said. No data sets are required because Diginet 160 units connect directly to leased telephone lines. Internal diagnostics permits the operator to use built-in testing techniques at both the terminal and computer ends of the line, GE said. Diginet 160s are available for $1,300/channel.

Tape Terminal Allows Selective Search

ROCHESTER, N.Y. – The 4100 Communications Terminal from Techtran Industries is an on-line cassette-loaded magnetic tape terminal. It is plug-compatible with teletypewriter, keyboard printer and CRT terminals, but is also designed for stand-alone use.

It provides incremental speeds from 110 to 2400 baud, and independent read/write speeds so that recording can be done at one speed and playback at another. The unit can operate in unattended mode. A high-speed search capability allows selective retrieval of data stored on the cassette. An IBM 2741-compatible version is available. Prices start at $1,650, from 580 Jefferson Road.

Mercutronic Unit Generates Ascii Code

ALEXANDRIA, Va. – Technicians concerned with design, manufacture or repair of equipment that utilizies Ascii code can generate any required characters with the Mercutronic Ascii Code Generator from Mechanical Enterprises Inc.

The $98 unit generates each of the 128 characters of the 7-bit Ascii code, on user command. It is wired for positive logic with a bounce-free TTL-compatible output from 5249 Duke Street.

Device Dials Calls for CPU, Terminals

LIVINGSTON, N.J. – An automatic calling unit designed to interface between data terminals and computers, the ACU-1801 is available from G-V Controls Division, Sola Basic Industries.

The ACU-1801 operates either with a Bell data access arrangement (DAA) or direct onto a dial-up telephone line. The units cost $450 each, from 101 Okner Parkway.

Bits & Pieces

Eight-Channel Multiplexer Handles Multiple Displays

BEAVERTON, Ore. – The 4701 Eight-Channel Multiplexer from Tektronix Inc. can be used with most XYZ storage and non-storage CRT displays to answer the need in many applications for multi-information displays.

The 4701 has eight differential input channels, and a calibrated time base. It is compatible with Tektronix type 601 and 611 storage display units, as well as with the non-storage 602 display unit and the 4501 scan converter. The Tektronix 4601 hard copy unit can be added to the 4701 to obtain paper copies of the CRT display.

The basic 4701 unit is priced at $1,500 and should be available in the second quarter of the year, through P.O. Box 500.

Unit Allows 32-Bit FP Math On 'Most' Minicomputers

BEAVERTON, Ore. – A hardware package from Floating Point Systems, Inc. can be used to allow minicomputers to perform 32-bit floating point arithmetic for 16-bit machines including the Data General Nova and Supernova, DEC PDP-11 and the Hewlett-Packard 2114. The device can be adapted to any other word length, including 8- and 12-bit formats, the company said.

The price of the device is $6,800, including interface and software, in 60-days from 4377 S.W. 142nd Ave.

Vacuum Used to Clean Cassettes

NORTH READING, Mass. – A tape cleaning machine from Acutor, Inc., the Vacutape uses vacuum and replaceable blades to recondition Philips-type tape cassette surfaces.

The unit cleans tape by having it ride over two uniformly ground and buffered surfaces. The first blade removes particles from the uncoated surface and the second blade cleans and laps the oxide surface. Vacuum keeps the blades clean, the firm said.

The Vacutape is priced at $295 and is available in 30 days through P.O. Box 311.

Tables Add Terminal Work Area

SILVER SPRINGS, Md. – Form fitting tables, designed by Terminal Data for use with Teletype units and IBM terminals, provide work surface as well as storage space and electrical connections.

Equipped with a formica top, the steel table offers a series of stacking shelves as an option. The Model 733, designed for Teletypes 33 and 35 sells for $139. The 735 and 737, designed for Teletypes 35 and 37, sell for $149, as does the Model 741, intended for use with IBM 2740 and 2741 terminals. Terminal Data is at 13447 New Hampshire Ave.

Cleaner Eliminates Tape Flaws

RESTON, Va. – Claimed to remove 95% of error-causing flaws, the General Kinetics, Inc. Model 7000 mag tape cleaner uses a continuously moving loop-shaped blade to shave particles from the tape surface.

The device cleans on a forward and rewind pass and checks BOT and EOT markers. Tissue wipers remove loose debris. The lease price of the GKI 7000 is $142.50 and it sells for $2,245. It is available in 30 days from 11425 Isaac Newton Sq. South.

OCR Needs Filled by Off-Line Devices

By Frank Piasta
CW Staff Writer

The independent supplier of computer-related equipment has been responsive to the needs of the user in the area of OCR.

This, in the opinion of a large user, is shown by the emphasis placed on off-line devices by the independents, while the mainframe makers emphasize on-line equipment.

While admitting that there are some instances where an on-line machine could be of value, the bulk of such current OCR users seem to feel that they were forced into their gear by the computer manufacturers, and would be willing, if not anxious, to go off-line.

Cost seems to be the principal drawback to the on-line system. While the initial cost of the hardware is lower, the total cost of the on-line system can be considerably higher due to the necessity for providing extra core, and magnetic tape storage.

An IBM 1287 that is run under DOS on a 360/40, for example, needs at least 33K of memory and two additional tape drives.

Hardware conflicts on this particular installation add significantly to the total real cost by reducing the system throughput. According to the user, a print run that is operating concurrently with the OCR would come to a virtual standstill, with the printer at times "stopping dead."

More positively, the on-line system gives way to the off-line in terms of scheduling flexibility. Most large OCR users would prefer to be able to process this data on a continuous basis.

This is sometimes made impossible, however, by the necessity of running jobs on the computer that are too large to allow the OCR programs to run concurrently.

The off-line units also give the user the flexibility to utilize any computer that he may have available to process the data.

This could and sometimes does mean that some of the OCR data could be processed on a Honeywell system, while other types could be handled on an IBM 360.

On-Line Advantages

The on-line devices do have their advantages. Total throughput time can be somewhat faster, from initial receipt of data item to the time it is introduced into the system.

In installations that have stringent editing requirements, the immediate response possible to bad data could be invaluable. In the same vein, the data manipulation that can be accomplished by the computer in the on-line application could eliminate some processing later.

It should be noted, however, that much of the same data manipulation is possible with the mini-equipped off-line units. These units could also be capable of performing a preliminary screening of the input, cutting down on the number of unreadable documents that would have caused an on-line machine to stop.

The user will make his own decision as to which of the two systems he will buy, but the experiences of current users seem to point to off-line equipment.

Cassette Recorder, Disk Drive Provide Low-Cost Mini Storage

COMPTON, Calif. – A cassette tape recorder and a series of disk files to provide mass data storage at low cost from Genisco Technology Corp. can be interfaced with a variety of minicomputers.

The ST-2 Minicorder stores more than 1.6 Mbits on a double-width data track organized into 1,536 blocks of 1K bits. A separate double-width address track expedites the locating of data under computer control.

Software and an interface are included for direct coupling to a variety of minicomputers including the Data General Nova, Supernova and 1200; the DEC PDP-8 line; Varian 620/i and 620/L; and the General Automation SPC-12.

Simple Construction

The ST-2 features a dual-precision capstan drive, single phase-locked motor and a cassette loading drawer that eliminates mechanical linkages. Genisco's reel tensioning system eliminates many previously required moving parts, such as reel motors, the company said.

The ST-2, complete with interface, connector, cable, and software is priced at $2,450. A power supply adds $225 to the cost.

The DS2 Series disk file features a removable 14 in. oxide disk containing 240 data tracks with 17,000 bit/track. Standard data organization is 1K bit/block with 16 block/track. Capacities of 4 Mbits and 8 Mbits are available.

Interfaces and software to adapt the DS2 to the Data General Nova series, the DEC PDP-8, or the General Automation SPC-12 are available.

Average latency time is 16.7 msec. The maximum head positioning time is 20 msec from track to adjacent track and 440 msec across 240 tracks.

The price of the 4 Mbit DS2-4 is $4,300 while the 8 Mbit DS2-8 costs $4,800, complete with interface and software. Genisco Technology Corp. is at 18435 Susana Rd.

Economy-Priced OCR Scanners Read Hand-Print, Mark Sense

NEWTOWN, Pa. – Two models of telecommunications-compatible optical scanners, the Opscan 12 and Opscan 17 from Optical Scanning Corp., are desk-top units capable of handling documents ranging in size from 2 in. by 4 in. to 8-1/2 in. by 11 in.

Scanning at 300 document/hr, the Opscan models are designed to accept handwritten block-printed numerics, a feature normally associated with more expensive systems, in addition to conventional mark reading marks. Also available is a printing line compatibility feature.

The Opscan 12 is designed for use with a minicomputer.

The Opscan 17 is meant for use as a remote terminal or as a stand-alone unit. When used as a stand-alone device, the user may select a number of output devices, including cassettes and punched paper tape.

When used remotely, the scanner can be used with a Bell data set or other type of modem, and data can be accumulated on a cassette for subsequent transmission.

The Opscan 12 will sell for approximately $3,500 and lease for about $125/mo. The Opscan 17 will cost about $5,000 and lease for about $195/mo. First deliveries are scheduled for July from Route 332 East.

Eliminates Btam

Unit Replaces Modem, Software

CLEARWATER, Fla. – Users operating in a communications environment can eliminate most of their special hardware, as well as software, with the 4,800 bit/sec Parallel Interface Extender (PIX-600), according to the developer, Paradyne Corp.

The device is said to combine a modem, an error control system, and an I/O channel interface. It can therefore replace such hardware as a communications controller, high-speed modem, data set adapter and remote terminal processor, the company claims.

Because the PIX-600 includes automatic error detection and retransmission capabilities, the user is freed from the use of Basic Telecommunications Access Method (Btam) or other communications software.

The PIX-600 can operate within the structure of conventional tape- and disk-based operating systems. It appears to operate as a conventional on-site computer peripheral and can be incorporated into the operating system with the same techniques used for additional resident I/O devices.

The unit is designed for direct connection to computer I/O channels, magnetic tape units, line printers, and card readers, Paradyne said.

In effect, the PIX-600 appears to a terminal as a remote extension of a standard parallel I/O channel.

Interfacing of nonstandard logic equipments can be easily accomplished, according to the company. Integration into software operating systems is straightforward and easily handled by most DP users, a spokesman said. Since the functional control of the device is independent of a remote device, communication between different families of computer systems and computer system terminals is practical, he added.

Able to function in full duplex, half duplex or dial-up mode, the PIX-600 is priced at "approximately $6,000" from 2040 Calumet St.

Graphics Terminal Produces Contours

CAMBRIDGE, Mass. – A graphics terminal that employs a technique using conic sections to produce any curved contour regardless of its mathematical function, the Conograph/10 from the Conograph Corp., can produce curvilinear drawings, graphics and symbols and alphanumerics.

Price of the Conograph/10 is under $9,000 available in 30-days from 380 Green St.

Versatile OCR Scanner Uses Film Input

LOS ANGELES – Grafix I, an optical character recognition system that reads from microfilm rather than from paper, can handle data from documents of any size or format, printed in any font, in any language, according to Information International.

The system uses film in the same sense that magnetic tapes and disks are used as input media, according to the company.

During a recent demonstration the system read filmed pages of copy prepared on standard office typewriters with different fonts.

Intended for the high-volume DP installation, the system is configured around three major components: a central processing unit, a scanner system and a binary image processor.

The CPU is a high-speed, large-scale, time-shared computer, with software that controls all data processing operations.

The scanner system includes a film transport with a 10 msec advance, and a CRT scanner that is capable of accessing more than one billion locations on the page image at speeds up to one million point/sec, the company said.

The Grafix I is described as an omnifont machine. If a font is not in the repertoire of the machine, it can be acquired, the company said, in minutes.

The price of a typical Grafix I system, including software, is $1,250,000. Information International is at 12435 W. Olympic Blvd.

CDS Punches Cards From Cassettes

CORPUS CHRISTI, Texas – The Adapta-Data system from Customized Data Systems, Inc. records data onto cassettes, transmits it over telephone lines, and punches it onto cards.

The Model 5210 is a modified ten-key adding machine, used to record data in Ascii on standard Norelco-type cassettes. The same cassette drive is used to transmit data over telephone lines at 110 bit/sec. A Bell 401E2 data set or 1000A data coupler with non-Bell modem can be used, the firm said.

At the receiving end, a CDS 3005 interface is used to connect a Bell 401J Bell data set to a specially equipped 024 or 026 keypunch. The keypunch modifications are available from IBM on an RPQ basis, at a cost of about $20/mo, the company said. The price of the interface varies from $30/mo to $40/mo.

The Adapta-Data 5210 is priced at $1,988, with an alphanumeric keyboard available at extra cost. The system will be available in April from 1630 So. Brownlee Blvd.

Bits & Pieces

Cartrifile Tape Transport Uses 3-Megabit Cartridge

MOUNTAIN VIEW, Calif. – A magnetic tape unit for minicomputers, the Model 1124 Cartrifile, uses the company's Bi-Track recording format that, according to the company, increases storage capacity and transfer rates above those claimed for other single-transport mini-tape drives. The 1124 is compatible with the company's four-transport 4196.

Model 1124 is cartridge-loaded with a tape pack that is capable of holding more than 3M bits. A bit transfer rate of 18,000 bit/sec enables the Cartrifile to transfer 16-bit computer words at 1,000/sec.

The Model 1124 is available with interfaces and software for use with such minicomputers as the DEC PDP-8, Data General Nova, and models by Hewlett-Packard, Honeywell and others. The system is priced at $3,600 from 800 Maude Ave.

PDP-15-Based Acquisition System Controls 100 Remote Instruments

MAYNARD, Mass. – A DEC computer-based system for data acquisition and control of as many as 100 different remotely located instruments simultaneously is meant for use in quality control testing, as well as in the industrial research laboratory.

The system includes the PDP-15, disk and magnetic tape storage, the RSX software monitor, and a stand-alone interface device that can connect instruments as far as 5,000 feet away to the computer. Up to eight different instruments can be connected through one interface, and as many as 50 interface devices can be attached to one computer.

Price of the system starts at $75,000 and increases with the number of interfaces selected. First deliveries are set for July.

Low-Cost 16mm Film Transport Uses Mag Tape Drive Principles

SAN DIEGO, Calif. – A 16mm film transport and magazine designed for use with COM equipment, from Cubic Corp., is said to sell for about $1,000 less than competitive units.

Effectively a camera without a lens, the FT-700 uses design principles described by the company as similar to those used in computer magnetic tape drives rather than those of a movie camera.

The unit uses Kodak throw-away film cartridges and most 16mm magazines, the firm said. It is priced at $1,950, with a 600-ft magazine priced at $185.

Calma Digitizer Converts Maps

SUNNYVALE, Calif. – Calma's Model 685 Graphic Data Digitizer is a low-cost device for conversion of maps and patterns to digital codes on computer-compatible mag tape.

The unit is equipped with a 48-in. by 60 in. tracing bed. To digitize graphic data, the operator traces the map, chart or drawing with a stylus. Movements are detected by rotary optical encoders and converted to digital codes for recording on seven or nine channel tape.

The output is in 5 digit (plus polarity) coordinates to identify the position of the stylus on the tracing bed. Calma is at 707 Kifer Road.

Tape Winder Designed for ASR-33

SAN DIEGO, Calif. – The DL-333 Teletype Processor Station from Datalink Corp., incorporating an electric winder and center-feed unwinder, is designed for use with the ASR-33 Teletype.

COMPUTERWORLD

societies/user groups

Honeywell Users Celebrate Decade, Anticipate 'Foundation' Status

DENVER, Colo. – The Honeywell Users' Group (Hug) will celebrate its tenth anniversary at its meeting here April 5-8 at the Cosmopolitan Hotel.

Heading the list of speakers will be the executive vice-president of Diner Club credit card company, Anthony F. Kopp, who will discuss "What the chief executive expects from his data processing system."

Agenda items include a proposal by Alan Taylor for a Honeywell Computer User Foundation. Taylor is president of Computer Management Aids Corp., of Framingham, Mass., and former editor of *Computerworld*.

Both the company and the user group will participate in extensive security sessions, to include precautions to guard both a data center and its programs and files. After a "security overview" presented by Honeywell, a panel will discuss all aspects of this topic, with questions from the floor.

Other areas of discussion will include COM, standards, and business applications of minicomputers.

ACM Appoints Katch National Lecturer

PALO ALTO, Calif. – David Katch, vice-president and cofounder of Boole & Babbage, Inc., leaders in computer performance measurement products and services, has been selected by the Association for Computing Machinery (ACM) as ACM National Lecturer.

The ACM lectureship series features industry leaders who can articulate on the emerging and contemporary developments taking place in computer technology.

Katch will address gatherings of computer professionals across the U.S. Slated for discussion are topics on improving the performance of computer systems through measurement.

Other Announcements

☆ Jeffrey Norton, information services publisher for Holt, Rinehart and Winston, New York, is the new president of the Information Industry Association.

☆ Thomas A. Galley has been named chairman of the new data processing/software technical department of the Association for Systems Management.

☆ James L. Hayes was elected president and chief executive of the American Management Association.

☆ William Christman has been elected president of the Systems Evaluation and Exchange of Knowledge (Seek) organization, an association of hospital administrators.

'S/3 Users' Formed

CANOGA PARK, Calif. – A nonprofit national association of users of IBM System/3 computers (Nasu) has been announced here.

System 3 is gaining such popularity that there exists a "dire need" for such a group, according to Director Irwin Cohan.

Information may be obtained from 23331 Vanowen St.

Data General Users Plan To Meet During SJCC

ATLANTIC CITY, N.J. – The Data General Users' Group will meet during the Spring Joint Computer Conference here in May, according to President Pro-Tem Donald L. Gross.

The exact schedule has not been set, but the executive committee of the group is expected to meet on Monday, May 17, to prepare a meeting agenda.

Management Seminars Go to Students

CHICAGO – The travelling series of three-day seminars on data center management being offered by the Association of Data Processing Services Organizations (Adapso) continues here April 21-23.

The seminars are aimed primarily at the service industry, and are entitled "Computer Operations Management in the Computer Services Industry." The sessions are offered through the Institute for Advanced Technology.

Topics covered include job scheduling, organization, equipment, maintenance, personnel management, recruiting, training, performance and evaluation, customer relations, and disaster protection.

A team of professionals in management education will cover "classical" and third generation computer operations of all sizes, focusing on the "latest technical advancements."

Adapso said the seminars respond to the "need for management education and development" in the data center services area.

Enrollment is open to members and prospective members of the organization, which is headquartered at 551 Fifth Ave., New York, N.Y.

Ervin at SJCC Lunch

ATLANTIC CITY, N.J. – The U.S. senator who conducted the investigation into computerized government spying will be the luncheon speaker at the Spring Joint Computer Conference, to be held here in May.

Sen. Sam J. Ervin Jr. (D-N.C.), chairman of the Subcommittee on Constitutional Rights, will address the Thursday gathering May 20.

While luncheon speakers often choose their own topics at the joint computer conferences, Ervin is expected to touch on the issues of computerized data banks and privacy as they relate to the conference theme of "Responsibility."

The conference, sponsored by the American Federation of Information Processing Societies, takes place May 18-20. Afips is at 210 Summit Ave., Montvale, N.J.

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Computer Utility as a Resource

Five-Year Plan Nurtures DP Use

Special to Computerworld

EAU-CLAIRE, Wis. – Faced with limited finances and a rapidly growing student body, the local branch of the state university has implemented the computer-utility approach to data processing, and now successfully serves both administrative and instructional users.

The conventional approach would have been to

Education

install two relatively small computers, one programmed in Cobol for administration, the other in Fortran for instruction/research. University DP representatives claimed this would have prevented many large-scale jobs from being performed.

The utility approach envisioned a single, larger computer which could serve both administrative and instructional functions simultaneously, applying the total computing resources to either type of usage when necessary for major projects, many of which would be impossible to do even on two smaller computers.

The system requirements included time-sharing, large-capacity file storage, and a full range of applications in many languages.

The university chose a Burroughs B3500 system, on the basis of detailed criteria and competitive benchmark programs. The configuration includes eight I/O channels, 1.2 million characters of main memory, with 40 million characters in auxiliary disk storage and the usual peripherals.

The terminal in a computer lab across campus is a Burroughs DC 1100 remote peripheral controller, which controls a card reader and line printer, while maintaining high-speed communications with the processor over a leased telephone line.

The data communications system provides the students and instructors a means of utilizing a large-scale system to assist in problem solving and instruction. By allowing this interface with the computer from a remote area, the DP center personnel are relieved of the task of processing "instructional" programs.

Student Usage Reports

The students also remain closer to their teaching stations, by not having to take their programs to the computer center to be processed. The instructors also receive comprehensive reports showing how each student is using the computer. Three programming languages are used: Cobol, Fortran and Assembler, and the system runs in a multiprogramming environment.

Pre-punched control cards are provided at each terminal, so each user is not required to become acquainted with all the ramifications of the "several control cards," according to DP Director Rudolph C. Polenz.

The university official said a "likely candidate" for expansion would be video display terminals, to give the administrative office the capability of on-line inquiry into student records, and for experiments in computer-assisted instruction.

The university eventually foresees a CRT in every administrative office on campus, Polenz stated.

Other likely expansion candidates include a Basic facility for time-sharing, with remote typewriters for student and faculty use. There is also the likelihood of adding "terminal computers" for a variety of administrative tasks that require on-line updating of computerized business records.

As for instructional terminals, the university will wait and see what the instructors desire, as they learn the advantages of data communications. Some are just familiarizing themselves with the equipment, after a five-year study and implementation program.

Most of the DP plans were made before many of the present course users were taking advantage of the computer. Only two math courses were originally using the equipment.

The planning was done with the assumption that computer usage would increase substantially, and it has. Nine different departments encompassing a multitude of courses are now using the data communications system.

The programs are based on a systems design developed jointly with Burroughs technical personnel, and university DP people complemented the company's Master Control Program, which controls priorities and integrates the instructional and administrative workloads.

Polenz said the administration has backed the DP efforts "100%. Without the administration's complete support, the five year plan could never have progressed to this working stage."

Illinois Gets 6400 for Plato

URBANA, Ill. – The University of Illinois Computer-Based Education Research Laboratory (Cerl) has received a Control Data 6400 computer system for research and development in the use of high-speed computers as teaching and learning tools.

The $2.6 million computer is to be used to continue development of Plato (Programmed Logic for Automatic Teaching Operations), which designates the computer-based education system as well as the overall program at the university.

If it has anything to do with Independent Peripherals, it should be in one of our three supplements.

Our February 24th Inputs Supplement

will feature:

- Which user sites can make best use of various keyboard input systems?
- What type of keyboard input system for you?
- What are the future trends in remote batch?
- Keypunches – new life in an old medium.

Our *Independent Peripherals Inputs Supplement* closes Feb. 5. Reserve your advertising space by filling out the coupon below, or contact your local Computerworld representative.

Our March 31st Memories Supplement

will feature:

- Which user sites can make best use of bulk memories?
- Can independent suppliers continue to provide savings to computer users?
- The trend to disks.
- What can independents offer besides lower prices?

Our *Independent Peripherals Memories Supplement* closes March 12. Reserve your advertising space by filling out the coupon below, or contact your local Computerworld representative.

Our April 28th Outputs Supplement

will feature:

- Which users can make best use of COM (computer output microfilm)?
- Can plotters have any applications to business?
- Printers – impact vs. non-impact, speed vs. copies.
- Is off-line output worth the cost?

Our *Independent Peripherals Outputs Supplement* closes April 9. Reserve your advertising space by filling out the coupon below, or call your local Computerworld representative.

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COMPUTERWORLD

1971 Memories Supplement

March 31, 1971

"THANKS FOR THE MEMORIES" might well be sung by many of today's computer users to the independent suppliers of bulk core, disk systems, and tape drives.

The use of independently supplied memory devices has allowed the user faced with a rising volume of data to postpone the acquisition of a new processor in many cases.

The availability of lower cost mainframe core could let the user expand the capacity of his system without breaking his budget. The use of more sophisticated software systems could allow the user to venture into multiprogramming, for example, at a reasonable price.

The larger user has the additional option of acquiring one of the several replacements available for the IBM 2361. Some of these match the speed of the processor, functioning as an extension of main memory. Swapping areas for disks, work areas for time-share users, and storage areas for operating systems can all be accommodated in the bulk memories.

The user who considered a newer processor so that he could use a faster disk system, or one with more capacity, might be better off considering independent drives to use as substitutes for his own system.

The drives not only offer better performance at a lower cost, but, in some cases, higher capacity than the units they replace. He could, in some cases, obtain a 20% increase in capacity and a reduction of about 50% in access time for the same amount he is presently spending.

The tape drive user has even more choice, with several models of independents from which to choose. By going to independent suppliers, not only can he have a wider choice of performance ranges, but also gain some operational convenience features not offered by his mainframe supplier.

As is the case with disks, the savings in cost to the tape user could amount to nearly one-fifth; savings that could be used to enhance the capacity of the system.

In view of the trend among computer manufacturers to introduce new systems that are software compatible with their older products, the savings in programming costs in upgrading from the third generation are not as important as they were when the third generation was introduced.

However, some measure of savings is still possible by eliminating the training necessary in using a new version of an operating system.

The transitional period from one system to another is often the cause of much anxiety on the part of the user. He cannot avoid worrying about whether the new machinery will operate as reliably as the old, and he knows that he will have to debug this one as he did the last, painfully.

This transitional period of parallel runs and countless minor aggravations can also be avoided by retaining the current equipment.

The prospect of retaining his system might give the user of leased equipment reason to consider purchasing it.

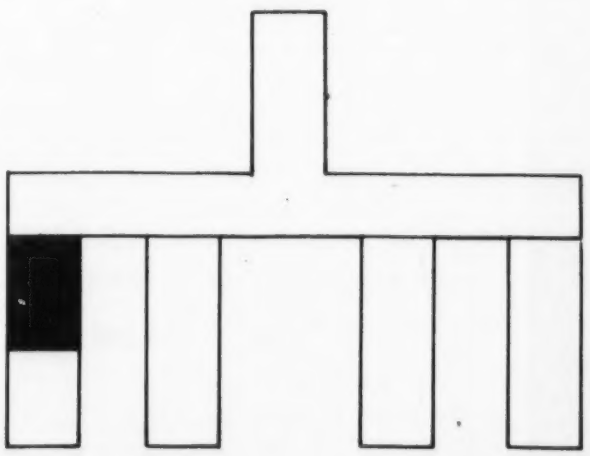
All told, the increasing availability of lower cost memory devices could result in benefits to users who are farsighted enough to take advantage of them.

Index

What every 360* user should know about the Cogar 70.

It saves you money.

The money you'd spend in moving to a more powerful system. The Cogar 70 all-monolithic add-on memory is designed to plug into your present 360 system. Increasing system capacity. Improving performance. With no changes to your software. That means your 360 may be all you'll need for another two, three or even five years. Quite a saving.



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*360 is an IBM designation for its computer systems.

An Unexpected Extra

Phase Encoding Provides Improved Error Correction

By Frank Piasta
CW Staff Writer

Improved error correction procedures are a bonus many users overlook when they decide to acquire 1,600 bit/in. magnetic tape drives.

Any user will say the increase in recording density amounts to at least a two-to-one advantage in the amount of data that can be recorded on a given length of tape. Most users are probably aware that the higher density drive employs a different recording technique.

Most users, however, would have difficulty explaining the difference between the NRZI technique used in most 200, 556 and 800 bit/in. IBM and IBM-compatible drives, and the phase-encoding technique used with the 1,600 bit/in. devices.

Both recording techniques record data by reversing the direction of magnetization to differentiate between 0 and 1 bits in a character.

NRZI Method

The non-return to zero, IBM (NRZI) method reverses the direction of the writing current every time a 1 is to be recorded within a character. A 1 can be represented by either a positive or a negative pulse, while the 0 causes no change in the direction.

The phase-encoding technique represents a 1 as being a positive pulse and a 0 as being a negative pulse.

Since a lack of data causes no pulse to be generated, this method allows a positive distinction to be made between a "no bit" and a 0 bit, lacking in the NRZI method.

This distinction also is responsible in part for the higher cost of the 1,600 bit/in. drives. They have to be capable of inserting an additional phase reversal at mid-bit so that two sequential 1s or 0s can be recorded.

Instead of the 800 phase reversal/in. that would be required from the 800 bit/in. drives, the 1,600 bit/in. units must be able to handle 3,200 reversals.

The positive identification of a missing bit, combined with a vertical parity check, permits the correction of single-bit errors without interrupting the data input.

One of the significant ways in which phase-encoding differs from NRZI is in the handling of vertical redundancy checking after writing. The NRZI drives perform a read-after-write check to determine if parity is correct, while the phase-encoding units perform both envelope checking and multiple-track error checking.

A weak signal from any track is detected by the envelope check on signal amplititudes. Abnormal changes in data rate during writing is detected by the multiple-track error check.

During reading, multiple-track error checking procedures are used to detect weak signals from two or more tracks.

During read operations, phase-encoding drives continuously perform a single-track error correction by searching for the absence of a flux reversal in any data frame in any one track. When detected the track contents are ignored.

The track is then regenerated automatically by using the vertical redundancy check bit to determine what the missing bit should be.

The higher density of the phase-encoded units can also allow the user to achieve a high throughput level at lower speed.

Many users feel that the faster drives cause more strain on magnetic tape, which can lead to premature tape failure due to tape stretching.

Another advantage of the higher density drives is improved cost/performance. The IBM 2401 Model 2 and the 2401 Model 4, for example, are both capable of 320K byte/sec. The 800 bit/in., 75 in./sec Model 2 rents for $485/mo, while the 1,600 bit/in., 37.5 in./sec Model 4 carries a lease price of $385/mo.

Minimum Configuration for Tape/Disk Are Starting Points for User Study

There is no quick formula to determine the amount and capacity of auxiliary memory devices needed by a user installation.

Certain minimum standards can be given to accomplish some types of tasks, but the number of units needed by a user, or the maximum practical size, should be based on a complete study of that user's present and future needs.

Most sort programs require in the minimum tape configuration that at least four tapes be used. An exception would be those systems which have a three-tape sort.

A case can be made for an additional drive, whose purpose is to provide another input source for multireel files. Also pertinent is the idea that a back-up drive could be provided.

If a sort program requires four drives, and the fourth drive becomes inoperative, a great part of the installation's workload would probably come to a halt.

Software Requirements

Third generation tape systems have to provide a drive to contain the system software. This raises the absolute minimum configuration to four or five drives.

Beyond this point, the nature and volume of workload has to determine configuration. Each file used in a program requires its own drive.

Additional drives that could serve as alternate input and/or output units when multireel file processing is performed would be advantageous.

Any installation that performs multiprogramming on a large scale could probably use as many drives as could be justified by the expected volume of business to the point of CPU saturation.

Disk Systems

The process of configuring a disk system is even more vague. For example, not even a sort can be used to justify a multiple drive minimum configuration. A sort can be run using one drive.

Because of the long access times on disk devices, the practical minimum number of disk drives is two, which allows the overlapping of access times on one drive with the prior read on the other drive.

As with tape systems, however, in installations that use extensive operating systems, a drive would be dedicated to that purpose. In this case, the minimum practical configuration would be three drives, with the balance of the systems pack usable as a work area.

In an installation that processes its data serially, the most expensive configuration is the most efficient, with a drive dedicated to each major file in a given program. Unlike tapes, this is not necessary as multiple files can reside on and be accessed from a single pack.

Installations that use random-access methods of processing have to provide sufficient bytes on-line to satisfy the requirements of the system.

Increase Efficiency

The multiple drives involved will increase the system efficiency by making it easier to hide the access time of the drives. This presupposes a software system and a programming staff sufficiently aware to use overlap techniques.

The problem of how to overlap accesses is also being solved to some extent by hardware. Some large Burroughs systems, for example, can presort the data to some extent and coordinate it with signals fed back from the drives indicating the rotational position of the disk. In this way, the record nearest to the heads can be requested.

The IBM 3330 also provides this feedback information, but the 370 lacks the presorting capability at present.

Operator Aids Can Up Thruput

Features designed to improve tape drive operation can result in increased system throughput and decreased data losses.

The proliferation of such additions as power windows, automatic threading and loading procedures, semi- and fully automatic reel latches, tape cartridges and dual density switches has made it possible to decrease the time lost between runs because of setup.

These operator convenience features, however, could represent a source of problems to the installation manager in the form of increased machine complexity and increased rental and purchase costs.

Improvements are by no means exhausted and users probably will benefit in the long run from all new gimmicks that save manpower and eliminate human mistakes.

Ampex breaks the throughput barrier

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AMPEX

Bulk Core Seen Replacing Disks in Fourth Generation

By Malcolm L. Stiefel
Special to Computerworld

Some day, when the fourth generation of DP equipment is finally proclaimed, an era will come to an end – the age of disk storage devices.

Instead, bulk core or other fast memories will be available in modules of millions, maybe billions, of bytes, at prices comparable to those of today's disk subsystems.

And the name of the system design game will change. No longer I/O bound, users will suddenly become interested in making their programs more efficient internally, to take maximum advantage of the astonishing increase in throughput that this revolution will afford.

Even if the bulk core is relatively slow (10 μsec access time), the change will be dramatic. It will be possible to search a million sequentially ordered records for a specific entry in 1 msec or less, even without the equivalent of the Indexed Sequential Access Method (Isam) to assist.

With the current 360s, a specific record on a 1316 disk-stored Isam file can be retrieved randomly in about 88 msec, on the average.

Today, bulk add-on memory is available at prices that make it prohibitively expensive for data storage. For example, four IBM 2361 Model 2 core storage elements hold about 8 Mbytes worth of data, a little more than one 1316 disk pack.

But the 8 μsec access core unit (usable with models 50, 65, and 75 CPUs) leases for $44,000/mo. while one 2311 disk drive and controller cost about $1,100/mo.

On the surface, the 40-to-1 price ratio would seem to be justified by an apparent 100-fold improvement in performance.

The user who is paying $25,000/mo for a complete system might be willing to shell out three times as much for two orders of magnitude of throughput improvement, but the actual net advantage, unfortunately, isn't that great.

For one thing, the disks aren't used 100% of the time; neither would the bulk core be. For example, suppose a system reads or writes on disk 80% of the time, reads or writes on tape 5%, reads or punches cards 5%, and prints 10%, with no overlap permitted among the various operations.

Then, if bulk core replaces disk, the disk usage time is reduced to 5%, but the other operations consume 95% of the time, and the net increase in system throughput is less than 5-to-1.

A 5-to-1 performance boost for a 3-to-1 cost increase isn't bad, but it can only be realized under certain circumstances. The original system must use disk predominately; the bulk core must be available for the system; and the amount of core must be sufficient to replace all of the disk capacity.

Otherwise the prime/performance ratio changes in a different way. If disk is only used 50% of the time in the original system, then the core replacement can only provide a 2-to-1 throughput improvement.

This is not to say that fast-access memories aren't useful unless they can replace disk areas normally used for data storage. On the contrary, they are used today primarily to speed up the overlaying of programs, which can spell a tremendous difference in response time in many applications.

To illustrate, suppose a frequently used set of programs is so large that it can't fit into a user's existing machine, so subroutines are written on disk and called in wherever they are needed.

If this slows down execution time considerably, the user may wish to consider a larger machine, or, as an alternative, some additional fairly fast memory.

In this case, the added memory doesn't replace anything. But perhaps only 500K bytes or 1 million additional bytes are needed to bring the response time down to reasonable limits.

Here, the user with a $20,000/mo system will probably be very happy to add $5,000/mo to the rental for an additional Mbyte of quick memory, to get a 2-to-1 or 3-to-1 increase in throughput.

Cost Primary Limitation

The primary limitation on the use of bulk core is certainly cost. Another, imposed by the computer itself, is capacity. Most computers have an unalterable addressing limit. More than 2^n addresses cannot be obtained from an n-bit address.

Thus, a 20-bit address can be used to access about 1 million distinct locations. If the bulk memory provides more than 1 Mbyte, it can't be used unless the addressing logic is changed. Some machines are readily expandable in this manner, but others aren't.

The Fourth Generation

When bulk memory prices come down by a factor of 10, and main memories up to 100 Mbytes are offered, the fourth generation will be upon us.

The total impact on processing will be enormous. Compilation times will decrease by a factor of three or more. Sort routines will handle tens of thousands of records in a matter of seconds, even with relatively slow CPUs.

On-line, real-time applications will proliferate, as information retrieval becomes easier and easier. Commercial time-sharing may become economically feasible, at last. File management systems will be unshacked. No more prepositioning of read/write heads. No more swapping. Less frequent reorganization of files.

Maintenance problems will diminish. System reliability will improve. And disk drive makers will redirect their energy to other things.

Then there will be a renewed interest in internal computing speed, which will continue until the last cycle has been stolen, until the last nanosecond is saved, until the impenetrable barriers imposed by physical laws are reached.

And the users will be happy.

Malcolm L. Stiefel is an independent consultant with extensive experience in systems analysis, design and evaluation.

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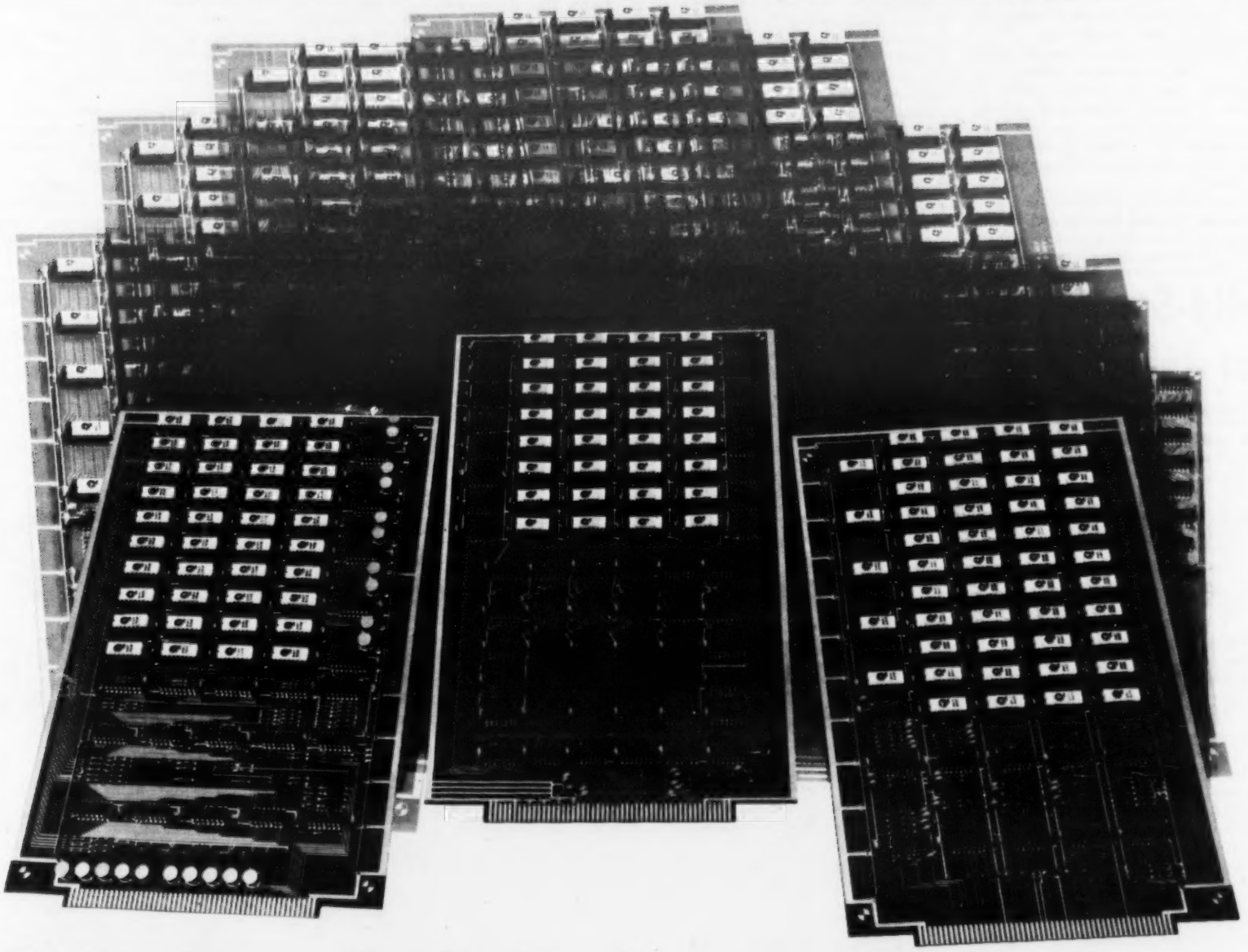

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Users Can Take Steps to Eliminate Bulging Libraries

By Frank Piasta
CW Staff Writer

Bulging, fat and overstuffed tape libraries are eventually faced by all managers of middle-aged installations.

The swelling number of applications, combined with increasingly stringent requirements for data retention, have resulted in a squeeze on available storage space.

But users can eliminate the space squeeze without adding a new wing to the tape library.

The recompilation of source programs to increase blocking factors and the reblocking of tapes for long-term storage are methods that use computer time, but this is offset by the net gain in space achieved.

In addition, tapes and disk packs can be free to hold more active files. Time can be scheduled at off hours to minimize the impact on production schedules.

Increasing the blocking factor is a common means of increasing the number of logical records that can be stored on a reel of tape. Inter-record gaps between physical records are reduced in number, and this space can be used for data. At a recording density of 800 bit/in., a 3/4 in. gap could be used to store 600 bytes.

The principle of large blocking factors can be applied to most installations on two levels.

The software system should be examined closely to determine if the largest possible blocking factor is being used by every program.

This would pertain especially to those installations that have upgraded their memory capacity.

The second approach involves reblocking archival files to the highest blocking factor that the hardware can handle. The highest bit density available should also be used.

Multiple reel tape files can often be reduced to a single reel. A simple merge keyed on the date field can be used or, if file integrity is of great importance, the files can be written to the tape separately, separated by tape marks.

The resulting concentrated data tapes would not be suitable for program input without going through a deblocking and file extraction run, but the time lost on this fairly infrequent procedure would be more than balanced by the overall savings.

The physical space occupied by tapes can be reduced by writing short files on small reels, which should be stored on special racks to maximize the space savings.

In the storage of active tape files, the tape cannisters can be replaced by the hoop-like devices currently available. This can result in a considerable space savings, but serious drawbacks exist.

Special racks that allow the hanging of the reels from the hoop should be purchased to take advantage of the smaller size.

Many installations will find that the hoops cannot be used with many of their tape reels, as only solid flanged reels can protect the tape from dirt.

The most important drawback is that the hoops should not be used for anything approaching long-term storage because of potential damage to the tape.

Tape manufacturers agree that the ideal method of storing a reel is to suspend it by the hub, and have designed cannisters accordingly. Putting pressure on the reel flange, as does the hoop, the manufacturers warn, can cause the flanges to flex and crimp the edges of the tape, resulting in permanent damage.

Solid-State Units Not Infallible

By a CW Staff Writer

Solid-state memory can supply extremely fast performance at a cost lower than the more conventional core but is not infallible.

In the future the solid-state memory promises to win many adherents and will undoubtedly be considered the cure-all to all memory problems. But solid-state memory is certainly not a panacea.

It has one drawback: liability to permanent amnesia.

Even a momentary loss of power will thoroughly wipe out the contents of a solid-state memory.

Admittedly, this was not a serious consideration in the applications where the memory is used as a short-term storage device, as in scratch-pad memories.

Even when used as the main memory, the batch-processing nature of most applications in use today allows the problem to be rerun, thus regenerating the memory contents.

The volatility of the solid-state memory was tacitly acknowledged by IBM in the 370/145 design which performs an initial program load from its disk memory whenever power is turned on.

Memory volatility could cause serious problems if the solid-state units were used as bulk random access storage or in real-time systems.

It is not difficult to imagine the havoc if a dedicated memory that could not be reconstituted should go blank. This could also apply to time-sharing systems where every user's program would have to be restarted.

Perhaps even more frightening is the picture of a multimillion byte memory, containing data that had taken months, if not longer, to amass, suddenly going blank, with no practical way of regenerating the data at the sources.

The last few years the computer industry has experienced the reality of power failure, with increasingly frequent outages.

As the power supply becomes less dependable, the prospect of imminent disaster might counsel against the use of a volatile storage medium.

There are ways to get around the problem. One would be to write frequent checkpoint records to enable the status of the memory to be reconstituted.

In the case of bulk semiconductor devices, the entire contents would have to be recreated in case of failure.

The alternate solution may be to insure against power failure through a sophisticated, uninterruptable and very expensive power supply.

In case of failure, the batteries would instantly supply the operating current until the auxiliary system could start, without loss of memory content.

In the future when the problems have been eliminated, the solid-state memory may find universal applicability. But for now, the technology should probably be considered as a special-purpose device.

No Copy-Cats They

Independents Have Pioneered Tape Drive Technology

By Fred Moritz
Special to Computerworld

In these days of plug-to-plug peripheral equipment, in which independent manufacturers seem to be "copying" IBM, many people, both within and outside the computer industry, tend to overlook the contributions made by these independents to the evolution of digital magnetic recording equipment.

At the present time there are a number of independent companies producing digital magnetic tape recording equipment, including Ampex, Potter Instrument, Telex, PEC, Kennedy, Precision Instrument, Cipher and Texas Instrument.

This article will attempt to highlight some of the contributions independents have made to the state of the art of current digital magnetic recording equipment.

From the early days of magnetic recording, the traditional way of driving the magnetic tape was to press it against a continually rotating capstan by means of a pinch roller assembly.

Even as late as the IBM 2400 series of tape drives for the 360 series computer, this method was used.

A number of the independents, working with manufacturers of low inertia motors, have developed highly reliable low inertia capstan drives in which the drive motor is started and stopped in controlling the tape.

This provides more gentle tape handling and more repeatable start-stop performance of the system.

Only in the past three years has IBM introduced a line of equipment (the 2420) which used this means of driving the tape, whereas the independents have been shipping this equipment for about five or six years.

Early tape drives designed by some computer companies used vacuum column and scramble bins to provide an intermediate tape storage between the reel and the tape drive mechanism. Such machines were rather large and expensive.

Some independents recognized the need for an inexpensive, efficiently packaged drive and developed the idea of the tension arm with rollers, resulting in machines packaged in a 19 in. by 24 in. envelope, but equal in performance to the larger equipment.

Direct Coupling

Independents also pioneered in the direct coupling of the reel drive motor to the tape reel, rather than using intermediate devices such as clutches and brakes, which tend to be inefficient, unreliable, and require frequent adjustment.

Mechanical switches, relays, vacuum switches and thyratron tubes, controlled power to the reel drive motors or clutches in the early machines. The use of semiconductors to control the reel servo motor action, introduced by an independent, produced a large increase in product reliability and helped to reduce the size of the drive.

Scotch-Lite Cuts Static

For many years, a problem that existed in high-speed recording equipment was the build-up of static charge on the tape as it rubbed on various metal surfaces along the tape path.

After trying a number of different schemes, independents lined the vacuum column walls with Scotch-Lite.

In many data handling applications there exists a requirement to record data which will arrive at the recording device at random rates.

A number of independents produced incremental tape drives, using various types of stepping motors and low inertia motors, which can record one character at a time and remain in a stationary condition until the next character is to be recorded.

This allows data to be gathered, recorded, and block formatted – all by the same recording system.

Recording Techniques

Independents have made significant contributions in the area of recording techniques and circuit design. When IBM equipment was operating at 200 bit/in. and 556 bit/in., one independent developed a high-density system which operated at 1,100 bit/in. and 110 in./sec and used a phase-encoding method for recording the data. The techniques used were similar to the accepted IBM 1,600 bit/in. system in use today.

For example, the post and preamble areas of a record in the system used 16 all 0 characters and one 1 character, whereas IBM uses 40 all 0 characters and one 1 character.

In addition, egg-crate buffering and data coding were very similar to the IBM system, which did not come into use until approximately five years after the first shipment of the independent high-density equipment.

Two recent independent developments in the field of digital magnetic recording have been the introduction of cassette recording devices and a new long-life head.

With the terminal equipment market expanding rapidly, many old and new independent companies developed recording equipment which uses the Philips cassettes and helped give birth to a complete new type of digital recording equipment. These devices are relatively inexpensive and small and will allow magnetic recording to be used in many areas where price and size have been prohibitive. Some of the companies in this field are Cipher, Computer Access, ICP and Sykes.

In addition, companies such as Tri-Data have designed proprietary cassette machines to allow an economical use of magnetic recording with minicomputers.

A long-life head which after 2,000 hours of severe computer operation shows negligible wear has been developed by an independent.

All the independent magnetic recording equipment manufacturers have on-going R&D programs to enable them to remain competitive with the computer companies. From these efforts will undoubtedly come even more contributions to the state of the art of equipment design as the computer industry continues to grow.

Fred Moritz is a design engineer with Potter Instrument Co.

Survey Reveals Growing User Preference for Disks

By Ned Chapin
Special to Computerworld

Talks with magnetic tape and disk suppliers and with a sample of users reveal that a turning point has come: magnetic disks are now the medium of choice for service as external storage. The supporting evidence can be seen in many places.

Computer vendors years ago offered only magnetic tapes and drums for secondary storage. Gradually they have offered more and more computer models with magnetic disks, while retaining their offerings of magnetic tapes and decreasing their offerings of magnetic drums.

Now all digital computers larger than the minicomputers, and many of those can be obtained with magnetic disks.

Users now are ordering more computers equipped with disks than tapes. This is a recent switch. A year ago, tapes still appeared to have the edge.

The total number of drives ordered is still in favor of tapes, since a tape installation typically uses more drives than a disk installation.

The sales of reels of tape and the sales of disks (not drives), have shown a more rapid rate of growth for disks than for tapes, measured in numbers of reel and pack equivalents.

Growth rates have exceeded 25% a year.

But in the past few years, the introduction of high-density tapes and the need to replace old tapes have buoyed the sales of magnetic tape. The replacement market for magnetic disks is still very small.

Measured in thousands of billions of characters, disk sales in 1970 were probably less than 5% of tape sales. But competition has stipped most of the profit out of magnetic tape. The keen competition has hurt the disk vendors too, but not as badly.

1970 was probably the first year the dollar value of disks sold exceeded that of the tapes sold. The vendors will put the push where the money and the profits are, and that is now magnetic disks.

Falling prices and improved recording densities have given real bargains to users in both tapes and disks.

One penny now can buy enough disk capacity to store hundreds of characters, and enough tape capacity to store tens of thousands of characters.

At such prices, raw cost/char to the user become trivial when compared to the costs of access. Since tape is a serial medium but disks permit fairly rapid random access, the user typically finds that using disks saves time, which usually overshadows the higher cost/char of the disks.

The random access permitted by disks gives the user far more option and flexibility in implementing systems. This wider choice enables the user to create systems that fit his needs more closely, and make it economic to do things that would be out of the question using magnetic tape.

On-line inquiry to large files is an example. Computer users are becoming more aware that when both tape or disk could serve, choosing tape cuts off or makes more expensive many possible avenues of growth and improvement in systems. Hence, even initially, disk is now the usual medium of choice.

Magnetic tape still has an important role and remains unchallenged for back-up storage and for low-cost, high-capacity applications requiring only serial access.

High density tape still enjoys almost a one-hundred-to-one cost advantage over disk when used on high-speed tape drives.

Even dramatic improvements in disks will probably fail to wipe out all of that advantage for such applications using magnetic tape.

Ned Chapin is a data processing consultant, specializing in the areas of systems analysis and design, and file organization and structure. He has published five books on data processing.

New IBM Tape System Called Milestone, Users to Benefit From Possible Trend

By Glen E. Dawson
Special to Computerworld

The 3420 tape series announcement by IBM in 1970 represents an epic milestone in the development of the 25-year-old computer industry and is welcomed by computer users everywhere.

For the first time, because of an apparent leveling in the growth of user data processing requirements, a major computer manufacturer, IBM, has offered a new product line with performance levels essentially equal to those of an old product line for less monthly rental.

Previously, computer manufacturers developed replacement products which had greater capacities, and greater costs. In essence, a very successful marketing strategy of the computer industry was to increase the cost performance of the equipment for the user, but always at a higher rental. This strategy was made possible because of the rapidly growing data processing demands of the user.

The 3420 tape series does not differ significantly from the 2401 and 2420 tape units with respect to recording densities, transfer rates, etc., but it does offer substantial reductions in monthly rental.

A typical 2420 tape unit/2803 tape controller configuration, for example, rents for $9,300/mo whereas an equivalent 3420/3803 configuration will rent for $6,035, a reduction of 35%.

In addition, the use of monolithic circuitry in the design of the 3420 increases its reliability and reduces its need for power and floor space.

Probable IBM Intentions

The 3420 is obviously a redesign of the older 2400 series, much like the independent plug-compatible devices were redesigns of the 2400 series, and as such, represents IBM's update of its tape products.

The 3803 tape controller is designed with a range of tape options previously available on either the 2401 or the 2420 series, but not necessarily on both.

Since IBM announced the 3420 as a 370 peripheral system which would also be made available for 360 users, the probable intent was to make the tape product line for both 360s and 370s by spanning the 2401 and 2420 product lines with respect to capabilities.

The apparent maturation of computer system tape performance requirements and its dramatic impact on the plug-compatible tape market represent two very important implications.

The absence of a market demand for faster tape transfer rates is not entirely unexpected due to the preoccupation of the computer industry with disk techniques.

However, the impact on the independent peripheral industry is drastic. It is estimated that the independents had some 10% of the 360 installed base of tape units by the end of 1970.

This market success was largely the result of the ability of an independent to design an IBM-compatible product taking full advantage of advancing technology, and then selling this product at a significantly lower price than that of IBM.

If normal IBM profit margins are maintained with its 3420 tape series, and there is no evidence to suggest otherwise, then the magnitude of the 3420 price reduction – 30% to 40% – best illustrates the price umbrella that was previously available to the independents through redesign.

Reducing this price umbrella will reflect unfavorably upon the ability of the independents to maintain their large profit margins of the last two years.

The 3420 announcement suggests that the user can expect many more products in the future that have equal performance but lower prices than preceding units.

Moreover, with the announcement of the 3420 tape series by IBM, there presumably does not exist any major design differences among the various tape peripheral manufacturers.

Future tape products probably will only be concerned with evolutionary improvements in options and reliability and will exhibit just gradual cost reductions.

Glen E. Dawson is a product and planning consultant with the Commercial-Industrial Division of Auerbach Associates, Philadelphia, Pa.

Editor's Note

The memories supplement has been edited by Frank Piasta, who is responsible for the systems/peripherals section of the newspaper.

Piasta was formerly an associate editor for Auerbach reports, a methods programmer for RCA, and a systems programmer for Arthur D. Little, Inc. He holds the Certificate in Data Processing.

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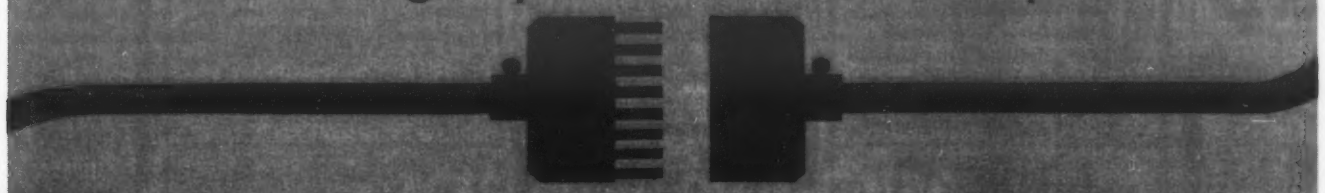

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March 31, 1971

CI Notes

Navy Signs for 43 B3500s

WASHINGTON, D.C. – The GSA has awarded a contract to Burroughs for 43 B3500 computer systems valued at $30.6 million. The systems will be used for the Navy's uniform logistic automatic data processing system. The contract is for installation of the machines at 22 Navy sites in the U.S. and overseas. The initial installation, according to Burroughs, will be made at Norfolk, Va., in 1972 and other installations will be made over a 15-month period.

Mini Merry-Go-Round

March 17 was a birthday at DEC, the tenth anniversary of the delivery of its first mini, which weighed in at a hefty $120,000. On March 19, however, upstart Data General announced the delivery of its 1,000th Nova, joining DEC, Varian, Hewlett-Packard and Honeywell – and IBM and CDC – in being able to use such nice round numbers.

Shortly after DG's announcement, though, word started creeping out of the woodwork, as it will, that DEC will deliver next month its 1,000th PDP-11, on top of the over 10,000 PDP-8s that have passed through the mill's doors. Incidentally, the latest census of dedicated application digital computers by *EDP/Industry Reports* lists 72 manufacturers offering 145 different machines.

Fed Schedules Bank Hearings

WASHINGTON, D.C. – The Federal Reserve Board will hold hearings Friday, April 16, on a proposal that would permit bank holding companies to provide DP services. Anyone interested in testifying should contact the secretary of the board no later than April 2.

General Computer to Expand

DALLAS – Shareholders of General Computer Systems who attended the annual meeting heard of the company's planned expansion into the general-purpose computer terminal market. GC hopes to begin delivery in September of a hard-copy display, Ascii code terminal that can also serve as a remote keystation for the firm's key-disk-tape entry system. Price hasn't been decided yet.

Supershorts

GSA contract numbers have been awarded to Redcor Corp.'s Keylogic system and Noller Control's DTS-100 remote batch terminal.

– – –

. . . And speaking of awards, International Data Sciences has won two from *Industrial Design* magazine for its Libra 1 key-to-tape terminal and its Range Rider modem test set.

– – –

. . . New name for Providence's Robert E. Radican & Co. – Concorse, Inc., and an acronym for consolidated corporate resources.

– – –

Cambridge Memories memory products will be sold in Japan by a new marketing company, Naco.

– – –

HIS has won an IRS contract for $6 million of data entry equipment.

– – –

L.A.'s Wang Computer Products boasts a "firm backlog" of over $6 million of tape drives.

Study Says European Market Cooling Off

NEWTONVILLE, Mass. – During 1971 the total number of computers used in Western Europe should rise from 29,100 to 32,500, according to a study recently issued by the International Data Corp. The value of this installed base will rise from $9.4 billion to $10.9 billion, but the share of the base held by U.S. manufacturers will slip from 80.3% to 79%.

The largest European user of computers is West Germany, where 27.5% of all the area's computers are located. Following are the United Kingdom and France with 22% and 20.5% respectively. Italy has 9.2%, while the Netherlands, Switzerland, Belgium and Sweden have 3% to 4% each.

In terms of trade groups, the Europe Economic Community (the Common Market or Big Six) dominates the market with 64.2% of installed base, and the European Free Trade Association (the Outer Seven) has only about one-third of the installed base.

The IDC report compares the progress of European computerization by comparing the countries to the U.S.

Western Europe, for example, has 182% of the population of the U.S., 77% of the GNP, but only 39% of the number of computers that the U.S. has. The Common Market, with 93% of the population and 49% of the GNP, has only 25% the number of computers.

The most advanced of the countries in computer use, West Germany, has 30% of America's population, 20% of its GNP and only 10% the number of computers. In other words, to reach the same state of computer utilization, measured by a count of number of computers in use, West Germany must double to triple its installed base.

Boom Not Booming

The study indicates that last year's boom in the European market is slowing down. The UK, according to the report, is in a "conservative recession," and its computer growth rate is slipping drastically. The Common Market, while continuing to buy computers at a high rate, is slowing down somewhat, and discovering the problems of inflation. West Germany remains the most active country.

The most active segment of the total EDP marketplace in Western Europe will be independent peripherals, for which IDC predicts a 26% growth rate in 1971. Revenues from mainframes will rise 18%, from $7.6 billion to $9.0 billion. Dedicated application computers will grow 20% to $630 million, and service bureau and time-sharing services will grow 22% to $1.5 billion, the report said.

The total of these market segments, plus leasing, software, education and supplies, will grow 17.5% this year, from $12.4 billion to $14.6 billion.

The study also includes long-range forecasts for these market segments, predicting an overall 16% compounded annual growth rate through 1975, at which time total revenues will have grown from $12.4 billion to $26.9 billion. The most active segment willl again be independent peripherals at 21% annual rate, followed by service at 19% and dedicated application machines at 18%. Mainframes will grow at a 17% compounded rate.

VIP Folds Text-Editing Service Because of Lack of Financing

CW Washington Bureau

WASHINGTON, D.C. – VIP Systems Corp. has announced that it will leave the text-editing business.

The company will, however, remain in the management consulting field, and VIP's current customers will be serviced by Bowne Time Sharing Inc. of New York City. Bowne's "Word/One" service is equivalent to VIP's "Vipcom."

The move, according to VIP President Joan Van Horn, resulted from an inability to get needed financing to pay off accumulated back debts including $65,000 in equipment rental delinquencies that it was directed by a court to pay IBM.

The money was due IBM March 31. According to Miss Van Horn, VIP asked IBM for an extension of time, but the manufacturer refused, adding that it would repossess its computer equipment. IBM confirmed this.

VIP, however, will continue to pursue an antitrust suit it filed against IBM last October. The suit charges that IBM and its wholly owned subsidiary, the Service Bureau Corp., "conspired to monopolize the markets for computers and automatic typewriters through the sale of teleprocessing services by unfair means."

The dispute, according to VIP, grew out of a continuing hassle between it and IBM over the text-processing time-sharing business which VIP entered in 1966, and which IBM entered through its former Information Marketing Division later the same year, only to move it to SBC, then to abandon it altogether [CW, Feb. 10].

The attempt to get needed additional financing, Miss Van Horn said, collapsed on March 12, and on March 19, she told the company's 34 employees that the text-editing business would be shuttered.

VIP will continue to specialize in such areas as computerized typesetting and information storage and retrieval. It will be staffed by four of the organization's current management people.

Memory Shops Fill Northern California

By E. Drake Lundell Jr.

CW Computer Industry Editor

SAN JOSE, Calif. – The peninsula stretching from here to San Francisco is becoming – if it isn't already – the mecca of the memory business.

While famed for its semiconductor memory activity, that's not all that is here – memory firms range from the super-small semi units through the entire memory menagerie up to Precision Instruments' trillion bit laser device.

Along the way, this area also encompasses much of the work in disk memories (IBM's research lab in the disk area is here) and there is a great deal of activity in the use of microfilm for storage. In addition, Ampex's Videofile system – using video tape for document storage – is also here.

In fact, only the solidly entrenched core memories go unrepresented, since they are largely clustered around the Los Angeles area, down the coast (Ampex Computer Products, Electronic Memories, and Lockheed).

The memory techniques of the late '70s and '80s are all here vying for a place in the market with the exception of cores, which some say won't pass away as quickly as predicted, and magentic domain memories under development at Bell Labs and Cambridge Memories, Inc.

The semiconductor memory industry is presently making the most noise, and like the squeaky wheel got first attention on a recent trip to the area.

Teledyne Semiconductor, still suffering some internal dissension since it was formed by the merger of Amelco and Continental, is just getting into the memory business, even though it claims to be the largest of the "second level" firms in the semiconductor field.

Using the philosophy of letting the "big boys fight it out and then second sourcing," the firm should be out with a 1,024-bit ROM and a 2,048-bit ROM in the next few months, both MOS and both "extremely price competitive."

Computer Microtechnology says that

On The Road

the industry will be producing MOS RAMs with 4K bits on a chip by 1973 at the latest and that RAMs with 8K bits will be common by 1975. At that time, according to engineering Vice-President Jack Schmidt, prices will be down to .1 cent/bit, where they should plateau.

In addition, the firm predicts that bipolar ROMs with 2K bits on a chip will be common within the next four years.

At Intersil, marketing Vice-President Mel Snyder said that MOS memory prices will be down to .5 cent/bit at the component level by the end of 1972, which he saw as the first year of high-volume production after a year of evaluation and prototype work in 1971. By 1975 Snyder sees the price hitting .2 cent/bit.

As to densities, Snyder said Intersil was trying to leapfrog development and come up with a 4K bipolar static memory by the end of 1971 – a move that would put it ahead of MOS densities while keeping the speed advantages of bipolar circuits.

American Microsystems, Inc. is taking a long look at the market after having jumped in too early a few years ago and the reevaluation will call for three product announcements in the second quarter of this year.

Ion Implantation

All of the announcements will have 1K bit/chip and two will take advantage of the ion implantation technique while one will be a second source of the Intel 1103 and use silicon gate processing. Until now the firm has stuck with p-channel techniques and said it wouldn't switch unless it could get the same reliability.

The whole semiconductor memory industry is waiting for that first big production order and hoping that it will come this year. Everyone has options on extra land for expanded production facilities – how many will be around to exercise those options this fall is another story.

Contracts

A.B. Dick Co. of Chicago has received a $50,000 subcontract award from the National Cash Register Co. to develop a non-impact, non-contact bar code printer that will be used as part of a developmental encoding and sorting machine system for the U.S. Postal Service.

Analytical Systems Corp., Burlington, Mass., has been awarded a $31,000 contract by the Department of the Army, Aberdeen Proving Grounds, for the development of a large-scale computational system to support Army research.

Burroughs Corp. will design, develop and install a code controlled letter sorting machine under a $1.3 million pact from the U.S. Postal Service.

The University Computing Co., Dallas, has landed a contract from PRD Electronics, Inc., Syosset, N.Y., for the installation of a system utilizing a Univac 1108 computer in support of the Vast (Versatile Avionic Shop Test) program.

Rainier Brewing Co. has selected Boeing Computer Services, Inc. of Seattle to provide data processing services.

A three-year, $2.2 million contract has been awarded to The Medicus Corp. of Dallas from the Baptist Medical Centers of Birmingham, Ala., to install a central DP center.

Advanced Space Age Products, Inc., Alexandria, Va., has received a contract in excess of $125,000 for medium-speed tape punches from the Futuronics Corp.

COM Executive Calls for Industry Leader

CW West Coast Bureau

GLENDALE, Calif. – A case for the domination of the computer output on microfilm industry was made by D. Peter Fisher, president of Computer Microfilm Systems, Inc.

He said that the COM industry has no dominant company and, as a result, no one is setting the standards or doing the major education job.

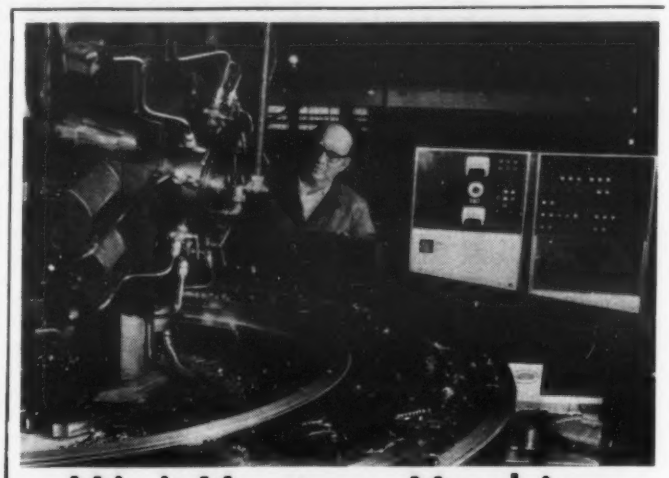
"In the computer industry IBM did the education job and the rest of us followed along and picked up the goodies where IBM did not excel. In the COM field, we have no such situation and therefore we are seeing price cutting; education in the field is behind schedule and there are no standards."

Fisher's new enterprise is a facilities management firm for COM systems. This is a new field and was created by the need for a programmer to adapt the tapes from the computer to retrieve the COM information.

There was also the need to evaluate equipment and expenses and determine the number of units needed by a particular installation.

In addition, the firm handles the financing problems.

On the ecology issue, he said that any installation that has large files of paper storage that are used infrequently or are dead files, not only has a storage problem but is preventing paper from being recycled. "We have reams and reams of paper generated by some industries. COM is the answer to it."



Mini Masters Machine

A Westinghouse Prodac 2000 mini is the brain for the first all-stored-logic contouring controller, driving an 86 in. turret lathe at the Bullard Co. in Bridgeport, Conn. Fifteen of the Westinghouse New World C20 numerical contouring controls, which cost from $27,000 to $55,000 depending on application requirements, are scheduled to be shipped in a few weeks.

U.S. Grant to Allow Development Of Computerized 'People-Mover'

PASADENA, Calif. – The Department of Transportation has granted $1,350,000 to the California Institute of Technology, Jet Propulsion Laboratory, for research and design of a radical new mode of automated personal transit known as a "people-mover." It will be computer-controlled, but the extent of automation is still in the design phase.

The new system will serve as a model for possible acceptance by city, regional and state transportation agencies. It will be installed at the West Virginia campus at Morgantown, W. Va.

Initially the system of fully automated cars will link the university's downtown campus with the uptown engineering and medical schools, carrying passengers at speeds up to 25 miles an hour.

The people-mover is part of a family of new public transportation modes currently under development by the federal department.

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Redcor to Sell Keylogic Systems Worth $7 Million

SAN FRANCISCO – Transamerica Computer Co. of San Francisco and Redcor Corp. of Woodland Hills, Calif., have reached an agreement whereby Transamerica will buy, subject to certain conditions, up to $7 million of Redcor's Keylogic systems, communication systems and data acquisition systems for lease to Redcor customers.

James Rush, president of Transamerica, and Emil Borgers, president of Redcor, announced that the agreement extends through 1971.

Concurrent with signing the agreement, Redcor issued to Transamerica warrants to purchase 150,000 shares of Redcor common stock at $6.31/share exercisable at any time over a five-year period.

Varied Tech Sessions Enliven IEEE Show

By Ronald A. Frank
CW Technical News Editor

NEW YORK – Computer technology was of major interest for firms attending the annual IEEE convention here last week.

Sponsored by the IEEE the exhibition listed computers and peripheral equipment as a separate exhibitor category even though aerospace-oriented components and instrumentation were, as usual, well represented.

Foreign exhibitors who displayed their wares included Australian electronics firms and companies belonging to the French federation of electronic industries. In general, European, Asian and Canadian firms were well represented.

IBM Package

IBM took advantage of the meeting to introduce its Ecap II electronic circuit analysis program for design engineers. The package was described as a powerful tool for dc and transient analysis by Larry Kugel, who said he had helped develop the program.

As part of the Ecap II introduction, IBM exhibited an 1130 system arranged in a scientific configuration that included a 1627 plotter and 2310 disk unit. The program will be available in October, Kugel said, at $150/mo for use on a 16K 1130. A 360/370 OS version will also be available for $170/mo.

Digital Equipment Corp. had one of the largest computer-related displays introducing the PDP-16 for dedicated applications [see story below].

DEC also showed the VT05 alphanumeric CRT terminal, which a spokesman said will sell for $2,995, the TU10 magnetic tape unit and RP02 moving head cartridge disk.

Japanese Peripheral

A high-speed serial printer from Fujitsu drew considerable interest from prospective users. Designed for use with the Facom computer series, the printer operates at 30 char/sec, handles a 95-character Ascii code set, and will be sold in the U.S. next year at about $3,000, a spokesman said.

Telcomp Corp. demonstrated its time-sharing service capabilities and announced a new financial planning program. A spokesman told CW that the service firm, primarily known for its scientific software and services, was planning additional business-oriented packages.

In the technical sessions, a demonstration of interactive sound and visual systems was presented by the Division of Art at Ohio State University. Described as a computer-animated art film, the demonstration presented real-time CRT displays of various artistic concepts controlled by a card oriented IBM 1130.

Financed by the National Science Foundation, the OSU system gives art students a computerized sketchpad to implement their concepts.

According to Wayne Bennett, an art major associated with the project, the combination of software-controlled film and graphic techniques could be used in educational environments where, for example, a complex abstract mathematical statement could easily be translated into a three-dimensional figure displayed on a terminal.

Although the techniques used in the Ohio State project are unique, the software will be available at a nominal fee in keeping with NSF policy. Another six months will be required to refine the 1130 programs, according to Prof. Charles Csuri, who heads the project.

Even though the film and graphics have been merged with specially developed programs, Csuri said he is now seeking additional funds to tailor the technology to specific applications.

A technical session on computer speech synthesis and voice response featured a speech produced on a Honeywell minicomputer at Bell Telephone Laboratories. Although easily comprehended, the voice apologized for being merely a computer and having limited capabilities. In response to a question, Dr. Cecil Coker, father of the voice, said in some ways it had the intelligence of a three-year-old, but in other ways it was inferior to a one-year-old.

Process Control Computer, PDP-16, Sells for $800 in Volume Orders

NEW YORK – Digital Equipment Corp. introduced a process control computer, the PDP-16, that is radically new in concept, and which will sell for as little as $800 in volume orders, at the IEEE convention here. For single orders the units would cost about $3,000.

According to Allan Devault, manager of control products at DEC, "No one has been able to break through the $2,000 to $3,000 price barrier except with stripped down versions of general-purpose minicomputers. The stumbling block has been excess hardware in the general-purpose computer. We believe the PDP-16 will establish a new standard."

The PDP-16 computers, called functional computers by DEC, are not designed for the general-purpose computer market as are its bigger brothers, the PDP-8/E and PDP-11.

"Instead," Devault said, "they are meant to appeal to those who wish to put together a computer-based system and who have defined their computer functions but do not want to pay for unnecessary hardware or software. In the past, this person had to accept the stripped down minicomputer and pay for components he did not need."

Individually Designed

The PDP-16 features a programming approach called Chartware, instead of the usual software. A user need only be able to construct a simple flowchart of the task for which he wants the computer, and DEC will design a PDP-16 specifically for him. The PDP-16 can be built with 16-, 12-, or 8-bit word lengths because of its new internal architecture. It is an asynchronous machine with add times typically in the 400- to 500-nsec range, depending on the application. First deliveries are set for June.

Although memory is not required for the PDP-16, a braided wire read-only memory and 16 to 512 words of scratch pad memory for simple manipulation of active data are available. The computer's bidirectional bus structure permits the interfacing of peripherals.

One of the important aspects of the PDP-16 concept is that the company uses its large-scale PDP-10 to design the machine to a specific application. Typically, a customer will supply a flowchart, or answer some simple questions about his application. Using Chartware, the PDP-10 translates the data into microprogrammed instructions and outputs all the information needed to customize a PDP-16 to the application.

IBM Granted Patent For I/O Error System

POUGHKEEPSIE, N.Y. – An invention that helps prevent interruption of computer operations when an error occurs in one of the system's input-output channels has yielded a patent to IBM.

An error in one of the channels used to control the exchange of information with input-output devices such as tape drives, card readers and punches normally halts the channel operation until the error can be corrected.

The patent was awarded to IBM Poughkeepsie engineers William E. Boehner and Bruce L. McGilvray and assigned to IBM.

World Wrapup

British Have Message

The UK's Post Office Corp. has asked for bids for a computerized transmitting system for overseas telegrams. Industry sources say the contract will be one of the largest ever placed in the world for message switching. Philips, the Dutch electric company, seems to have the inside track. At least three major computer groups have been seeking the contract for the system, which has been the subject of several years of design studies. Philips' hang-up may be the UK's Buy-British policy.

Philips Data in Quebec

Predicting $1 million sales for its P350 office computer series in the Province of Quebec alone, Philips Electronics is establishing a new division in Montreal and plans to open a second branch in Quebec City in the near future. Philips employs 250 Quebecois, and the company's total investment in the province is over $16 million. The 350 series was introduced there a year ago, and 70 systems ranging in price from $10,000 to $34,000 have been sold since then. The machines are designed for small businesses.

$180,000 Input Order Made

Data capture equipment valued at $180,000 – 22 stations worth – has been ordered by Brooke Bond Oxo from Britain's Interscan Data Systems. In addition to the operators' stations, the installation will include a supervisory station, a 40K processor, two 850K disk units and two mag tape drives. Brooke Bond figures the system will cut input costs by 50%.

Diebold Succeeds in UK

Diebold Computer Leasing has put over $12 million of equipment on lease in its first year of operations in the UK. What's more, net profit in the first year was above $72,000. The forecast for 1971's net is in the area of $500,000. One of Diebold's selling weapons is a variety of machines, including Univac, Burroughs and ICL equipment, as well as the ever popular 360.

Out of Balance

In the computer department, Britain's balance of trade is getting worse and worse. While in 1970 exports rose 45% to $185.8 million, imports in the same period rose 52% to $356.2 million. A main reason seems to be the large amounts of peripheral equipment imported to support both local and imported CPUs.

Imports of peripherals for 1970 totalled $123.8 million, while exports were only $20.9 million. British experts say the trend will continue through 1972, when the balance will begin to feel the effect of new peripheral manufacturing plants being built by U.S. firms.

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COS/MOS Integrated Circuits Offer Operation at 3V to 15V

SOMERVILLE, N.J. – A new line of low-voltage, low-cost COS/MOS (Complementary Symmetry Metal-Oxide-Semiconductor) integrated circuits designated the CD4000A Series, offers operation at 3V to 15V. The circuits from RCA Solid State Division, feature higher logic speeds, high noise immunity and direct interfacing with bipolar TTL and DTL logic circuits.

New OEM Products

Twenty-three circuits are included in the series, ranging from gates, flip-flops, buffers, logic-level converters, multiplexers, memories and decoders to MSI circuits. The latter include shift registers, counters/dividers, adders and parallel processors.

At least 18 additional COS/MOS ICs will be introduced before the end of the year. The 41 circuits should satisfy approximately 50% of standard applications for COS/MOS circuits, according to RCA.

Power dissipation is 10 nW/package typically for gates and 1 uW typically for MSI circuits. Noise immunity is typically 45% of supply voltage.

Speeds are as high as 10 MHz for gates and flip-flops. Temperature stability is ±1.5% at -55 to +125°C temperature range.

Prices for the 23 available circuits, in 1,000 quantities, range from a low of 96 cents for the CD4000AE dual 3-input "NOR" gate and inverter to $5.70 for the CD4020AE 14-stage ripple counter.

The circuits are now available from stock in commercial quantities.

"RCA COS/MOS Integrated Circuits Manual, CMS-270," an eight-page product guide, a 72-page data bulletin and a series of application notes, technical articles and reliability reports may be obtained from RCA Commercial Engineering, Harrison, N.J. 07029.

Scanner Gives Digital Output

TETERBORO, N.J. – A new solid state electro-optical scanning device, Solidscan, provides high resolution conversion of optical image input directly to digital output.

Solidscan is a multilayer sandwich, comprised essentially of a layer of electroluminescent phosphor within a cross-grid of thin electrical conductors, laminated to a continuous layer of photosensitive semiconductor material.

The Solidscan element can convert an optical image into 90,000 to 360,000 individual points/sq in. as direct digital readout, according to Optonetics, Inc.

In addition, Solidscan is operated in a multichannel mode in which multiple points within the optical field of view are simultaneously interrogated (parallel addressing).

Specifications include: field of view, 10 by 10 degrees; number of scanning elements, 400 by 400; linear resolution, 300 elements per linear inch; scan rate, 100 kHz; output signal, digital binary code; power required, 15 W; and size 4 in. by 4 in. by 6 in.; and weight, 8 pounds. Optonetics is at 32 Henry St.

Multipurpose Mini Is Modular

LITTLE FALLS, N.J. – A new multipurpose modular computer, the SKC-2000, marketed by Singer-General Precision, Inc., Kearfott Division can serve in a wide variety of applications such as multisensor navigation, recon data processing, command and control, weapon delivery, electronic countermeasures, launch and space vehicle data processing, flight management data processing, multicomputer and multiprocessing uses.

SKC-2000 computer modules may be configured in a variety of ways. For example, by combining memory, power supply, central processor and input/output modules, all interconnected by a control/data bus, a simplex computer is formed. Tying three or more such simplex computers to a single bus extension creates a multicomputer system.

A single bus consisting of 32 data lines, 17 memory address lines, six processor/device code lines and several control lines serves as intermodule communication.

The central processor module, using parallel organization and floating point arithmetic, operates on 32-bit operands and has double precision add and subtract instructions for those computations demanding exceptionally high accuracy.

Modes of address may be direct, indirect, relative or immediate, with relative addressing combinable with either direct or indirect addressing.

There are 131,072 memory words that are directly addressable, and the central processor module employs binary, floating point and two's complement fixed point number systems.

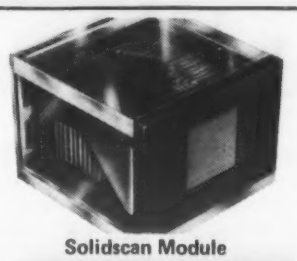
Memory modules, designed as independent, asynchronous modules of 4,000 or 8,000 words by 32 bits, are standard ferrite core elements having 1.9 μsec cycle time.

A software package including an assembler, a loader, arithmetic and interpretive simulators and utility and diagnostic routines, complements machine language programming, and is available in addition to hardware designed for the programmer.

Modem Ends Transmission Errors

BURLINGAME, Calif. – Dataserv has announced a new data modem that solves the ever-growing problem of unreliable transmission and reception in time-shared computer systems – especially in the many communities where telephone-line performance has deteriorated below acceptable EDP limits.

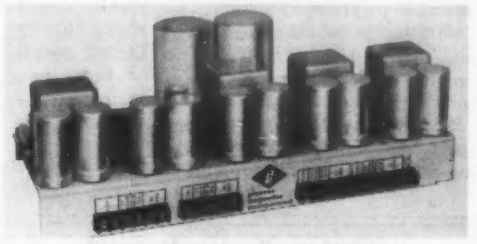
The Model 1310, when installed in a data terminal or peripheral device, provides all the functions of the Bell 103A Data Set, including Long Space Disconnect, plus added diagnostic capabilities and greatly enhanced signal/noise sensitivity, according to the firm.



Solidscan Module

Riot Multiplexer

Kearfott Modular Mini



Pioneer Magnetics Power Supply

The new modem is an "all-digital" design, employing two integrated circuits that derive all time delays and carrier frequencies from a single crystal ocsillator. On one chip, the transmitter modulator divides the crystal frequency by one of four exact integers corresponding to one of the four modes of operation: originate space, originate mark, answer space and answer mark.

The firm is at 770 Airport Blvd.

Riot Expands Computer Channels

BINGHAMTON, N.Y. – National Electro-Mechanical Systems, Inc. has developed a device which permits additional operational functions using existing computer channels.

Working through a Special Purpose Multiplex (SPM) channel, the Nems' Remote Input/Output Terminal (Riot) communicates with an IBM 1800 computer. Information is transmitted to the computer in 16-bit words.

Riot also receives information from the computer in binary or binary coded decimals. In most applications, Riot would be used in conjunction with Nems' remote interface module, which serves as a multiplexer.

Nems Riot Model 120 accepts and displays through a set of 16 push-button switch/indicators. Nems' Riot Model 115 features a 16-digit Nixie readout with each digit independently programmable.

National is at 32 Broad Ave.

Multichannel Supply Lightweight

SANTA MONICA, Calif. – Pioneer Magnetics, Inc., has announced a new lightweight, power supply for the requirements of small to medium computer systems and computer peripheral equipment. The new converter line is designed in accordance with Underwriter's Laboratory Electronic Data Processing Units and Systems Safety Standard UL478.

Automatic on-off output voltage programming is available for specified start up and shut down sequencing requirements.

The standard unit operates over an input voltage range of 105-135 Vac, 47 to 2,000 Hz, and is available with output voltages from 4Vdc to 50Vdc and output currents to 60A. Operation is independent of input power frequency.

Regulation of ±2% includes maximum deviations for line, load, transients, ripple, temperature and long term stability. Pioneer is at 1745 Berkeley St.

CCRT Aims at Management Area

TORRANCE, Calif. – Control-By CRT Inc. (CCRT) is a new company formed to provide computer information for management control. Based on real-time computer techniques, its on-line service features immediate visual response systems.

All standard input requirements – from programming to keypunching – are eliminated. Output information typically reaches the user via a CRT. The company connects data-collection terminals to its network and maintains centralized system facilities for many users.

Other New Companies

★ Applied Computer Graphics has begun operations, with headquarters in Silver Spring, Md. Services offered by the new company include software support, equipment selection studies, system design, programming services and proprietary computer systems.

Emerging Enterprises

★ Marketing Consultants Inc., Annandale, Va., has been formed to augment the sales calls of factory salesmen and representatives in the electrical instrument and computer peripheral industries by analyzing customer sales possibilities.

Mohawk, Colorado Instruments to Merge

BROOMFIELD, Colo. – Mohawk Data Sciences Corp. and Colorado Instruments have agreed in principal to merge.

MDS is a manufacturer and marketer of peripheral DP equipment and Colorado manufactures and markets source data collection systems as well as specialized components including keyboard switch assemblies to other equipment manufacturers.

Richard P. Rifenburgh, president of MDS, and Richard C. Webb, president of Colorado, stated that the proposed merger should benefit the shareholders of both companies in view of their mutuality of interest in the data input and output field.

The officials announced that the exchange ratio for the proposed merger has been established at one share of MDS common for seven shares of Colorado common stock. On the basis of this exchange ratio, MDS will issue approximately 81,500 shares for the stock of Colorado.

Colorado also has employee stock options and warrants outstanding to purchase an additional 74,000 shares of its stock. The definitive agreement will be prepared shortly and submitted to the board of directors of both companies and the stockholders of Colorado.

In the six months ending Jan. 31, 1971, MDS earned $2.3 million or 43 cents per share on revenues of $45 million. Colorado reported revenues of $594,410 (of which approximately 35% were to MDS), and a net loss of $393,837 in the six months ended Nov. 30, 1970.

Colorado's operations will continue under its present management here.

Financial

Calcomp Revenues, Earnings Jump

ANAHEIM, Calif. – California Computer Products Inc. has reported that earnings quadrupled and revenues doubled in the six months ended Jan. 3, 1971, compared with results for the corresponding period last year. Net income was $991,365 on revenue of $20.8 million or 43 cents per share, compared with net income of $231,883 on revenue of $10.4 million, or 10.2 cents per share, a year ago.

Lester L. Kilpatrick, president, attributed the increase in revenue and earnings to computer disk drive memory system volume, which "was not a significant factor last year."

"On March 10, the Calcomp board of directors voted to follow the original agreements which provide Calcomp the option to acquire the remaining 35% minority interest of Century Data Systems Inc., on an earnings formula basis over a period of five years," he said.

Full Ownership

"The board has chosen this course rather than the previously announced plan to acquire full ownership of the disk drive subsidiary this year. Calcomp will continue to report 100% of Century sales and 65% of Century earnings during the last half of this fiscal year. Prospects for the balance of the year are excellent."

Acquisitions

Scientific Software Corp. (SSC) has purchased the assets and business of **Geo-Science Computing** from Geo-Science Associates, Inc. Geo-Science Computing would be moved to SSC facilities and coordinated with its operations in petroleum and mining. SSC also provides consulting and DP services.

Syntonic Technology, Inc., Louisville, Ky., plans to expand its Louisville operations through the acquisition of **Industrial Communications**, also of Louisville. Syntonic Technology provides maintenance and service for communications and DP equipment.

Western Union Corp. has acquired **Distronics Corp.**, Cherry Hill, N.J. Distronics offers teleprocessing services for wholesale distributors, using long-distance communications lines.

Under the terms of the agreement, Distronics will operate as a wholly owned Western Union subsidiary. An exchange of 36,270 shares of Western Union common stock for all capital stock of Distronics is planned.

Nickels & Dimes

First-half sales at **Sanders Associates** drooped to $78.2 million from $84.8 million a year ago, but earnings inched up from $265,000, or six cents a share, to $375,000, or eight cents a share. While admitting that second-half results "are expected to be slightly lower than earlier forecasts," Sanders had great things to say about 1972. The earlier forecasts called for an improvement over fiscal 1970's results of $782,000 net earnings, 17 cents a share.

$$$

Levin-Townsend Computer will sell 85% of Tolley International Corp. – formerly Levin-Townsend Service Corp. – to Russell M. Tolley, head of the subsidiary. Terms were not disclosed. L-T President James E. Townsend said the sale will help the company deal with its liquidity problem. He also revealed that Tolley International will report a loss for the fiscal year ending March 31, because of discontinued programming and data center operations.

$$$

Confronted with the possibility that the State of Minnesota may repeal the exemption of inventory from property tax liability, **Control Data** President William C. Norris hinted that his firm might move some of its activities out of the state. Norris said that resumption of the tax on inventories would cost CDC $6 million, and "the blow would be staggering."

CDC's computer operations lost $41 million last year. The tax would cause "severe damage," Norris said, and the company "would have to consider alternatives" to its Minnesota operations. CDC employs 12,000 Minnestoans, and in 1970 its payroll in the state amounted to $122 million.

$$$

As shareholder meeting time comes closer: **Honeywell** has received SEC approval to reject two proposals and accept three others submitted by "The Council for Corporate Review" for inclusion in proxy material. The three included proposals, which management will oppose, call for an increase in the number of directors from 14 to 16, amending the bylaws to prevent a Honeywell director from serving as a director or officer of more than one other publicly held corporation, and the establishment of a "Honeywell Shareholders Committee on Corporate Responsibility."

The two rejected would call for the company to stop dealing with countries such as South Africa that support racial discrimination, and to avoid any activity that "may foreseeably be detrimental to or exploitative of human life, health, safety, environment or productivity, notwithstanding any policy or corporate profit, nationalism or any other policies."

TRADE*QUOTES

Computerworld Stock Trading Summary

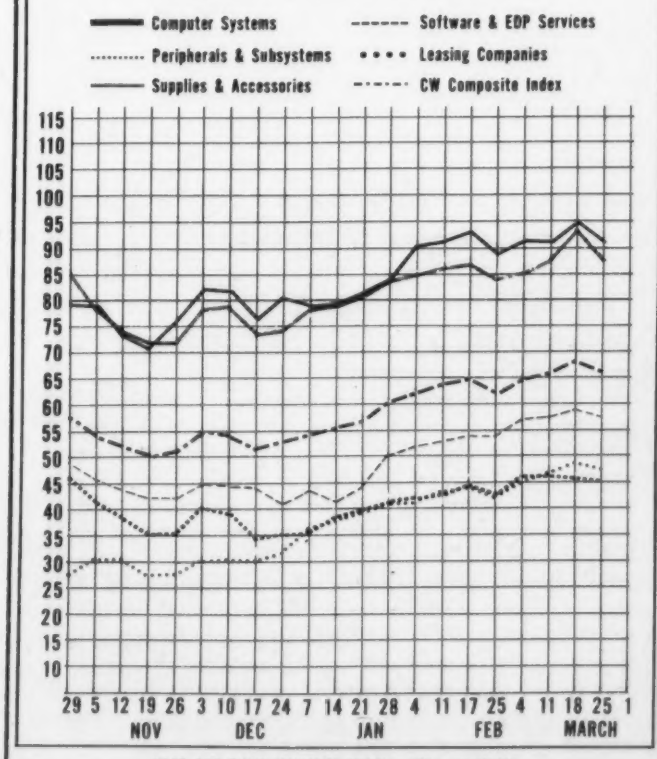
All statistics compiled, computed and formatted by TRADE★QUOTES, INC. Cambridge, Mass. 02139

CLOSING PRICES THURSDAY, MARCH 25, 1971

EXCH		1970-71 RANGE (1)	CLOSE MAR 25 1971	WEEK NET CHNGE	WEEK PCT CHNGE
	SOFTWARE & EDP SERVICES				
O	ADVANCED COMP TECH	1- 10	2 1/8	- 3/8	-15.0
A	APPLIED DATA RES.	4- 24	10 1/8	- 3/4	-6.8
O	APPLIED LOGIC	1- 18	1 1/2	0	0.0
O	ARIES	1- 8	1 3/4	- 1/8	-6.6
N	AUTOMATIC DATA PROC	23- 57	54 1/8	-1 3/4	-3.1
O	AUTO SCIENCES	3- 14	7 3/8	- 1/4	-3.2
O	BOOTHE DATA SYS	1- 2	1 1/4	+ 1/8	+11.1
O	BRANDON APPLIED SYS	1- 10	3/8	0	0.0
O	COMPUTER AGE INDUS.	1- 3	3/4	0	0.0
O	COMPUTER ENVIRON	1- 15	1 1/4	- 1/4	-16.6
O	COMPUTER INDUS.	2- 24	5	0	0.0
O	COMPUTER NETWORK	2- 14	7	- 1/4	-3.4
O	COMPUTER PROPERTY	4- 15	7	- 1/4	-3.4
N	COMPUTER SCIENCES	6- 34	11 7/8	- 1/2	-4.0
O	COMPUTER TASK GROUP	1- 4	1	0	0.0
O	COMPUTER USAGE	2- 16	10 1/4	+ 1/8	+1.2
O	COMP AUTOMOT REPORTS	3- 11	7 3/8	- 5/8	-7.8
A	COMPUTING & SOFTWARE	16- 75	39 1/4	-1 1/4	-3.0
O	COMRESS	1- 10	2 5/8	- 1/4	-8.6
O	COMSHARE	2- 15	5 7/8	+ 7/8	+17.5
O	CONSOL. ANAL. CENT.	1- 4	1	- 1/4	-20.0
O	DATA AUTOMATION	1- 24	2 5/8	+ 1/8	+5.0
O	DATA PACKAGING	5- 29	7 3/4	- 1/4	-3.1
O	DATAMATION SERVICE	1- 6	1 5/8	+ 1/8	+8.3
L	DATATAB	4- 9	7 3/8	- 7/8	-10.6
O	DIGITEK	1- 5	1 3/4	- 1/8	-6.6
O	EDP RESOURCES	5- 13	9 3/4	+ 3/4	+8.3
A	ELECT COMP PROG	3- 11	5 5/8	- 1/8	-2.1
N	ELECTRONIC DATA SYS.	31-161	84 3/4	+5 1/2	+6.9
O	INFORMATICS	4- 21	8 7/8	0	0.0
A	ITEL	6- 26	19 7/8	-1 1/4	-5.9
O	KEYDATA CORP	7- 14	10 1/4	- 5/8	-5.7
A	MANAGEMENT DATA	7- 25	9	-1 1/8	-11.1
O	NATIONAL CSS INC	4- 16	11	-1 1/4	-10.2
O	NAT COMP ANALYSTS	1- 8	2 5/8	+ 5/8	+31.2
O	NAT.COMP. SERV.	2- 12	2 5/8	+ 1/8	+5.0
N	PLANNING RESEARCH	13- 54	24 1/4	+ 3/4	+3.1
O	PROGRAMMING METHODS	9- 29	20 1/2	-1	-4.6
O	PROGRAMMING & SYS	2- 5	3 1/4	+ 5/8	+23.8
L	PROGRAMMING SCIENCES	1- 33	1/4	- 1/8	-33.3
O	SCIENTIFIC RESOURCES	1- 22	1 3/8	0	0.0
O	SOFTWARE SYSTEMS	1- 3	1 1/4	- 1/8	-9.0
O	TBS COMPUTER CENTERS	4- 27	4 3/4	- 1/2	-9.5
O	TOLLEY INTL CORP	1- 13	5 1/2	+1 1/4	+29.4
O	UNITED DATA CENTER	1- 5	4 5/8	+ 5/8	+15.6
N	UNIVERSITY COMPUTING	14- 99	27 1/8	0	0.0
A	URS SYSTEMS	5- 21	8 7/8	-1 1/2	-14.4
O	U.S. TIME SHARING	1- 14	1 3/4	0	0.0
	PERIPHERALS & SUBSYSTEMS				
N	ADDRESSOGRAPH-MULT	20- 62	33 5/8	-1 5/8	-4.6
O	ALPHANUMERIC	2- 15	4 1/8	- 3/4	-15.3
N	AMPEX CORP	13- 48	21 3/4	- 1/4	-1.1
O	ASTRODATA	1- 34	1 1/8	- 1/8	-10.0
O	ATLANTIC TECHNOLOGY	2- 14	4 7/8	- 3/4	-13.3
A	BOLT,BERANEK & NEW	3- 11	6 7/8	- 3/4	-9.8
N	BUNKER-RAMO	6- 15	13 3/8	- 7/8	-6.1
A	CALCOMP	11- 36	30 1/8	- 5/8	-2.0
O	COGNITRONICS	3- 13	6 3/4	- 7/8	-11.4
O	COLORADO INSTRUMENTS	4- 12	4 1/4	- 1/4	-5.5
O	COMPUTER COMMUN.	5- 36	16	0	0.0
A	COMPUTER EQUIPMENT	4- 12	6	+ 1/8	+2.1
A	COMPUTEST	12- 28	18 1/2	+ 7/8	+4.9
O	CONSOL COMPUTER LTD.	4- 14	10	+ 3/4	+8.1
A	DATA PRODUCTS CORP	5- 26	8 7/8	- 3/8	-4.0
O	DATA TECHNOLOGY	2- 23	8 1/8	+1 3/4	+27.4
O	DIGITRONICS	3- 13	5	- 7/8	-14.8
N	ELECTRONIC M & M	7- 40	13 1/4	+1 1/4	+10.4
O	FABRI-TEK	2- 8	2 1/8	- 1/8	-5.5
O	FARRINGTON MFG	1- 17	1 1/2	0	0.0
O	FOTO-MEM INC	2- 39	2 1/8	+ 1/8	+6.2
O	INFOREX INC	16- 42	41 1/2	+3 1/4	+8.4
O	INFORMATION DISPLAYS	4- 20	5	- 1/8	-2.4
O	MANAGEMENT ASSIST	1- 4	1 3/8	- 1/8	-8.3
A	MARSHALL INDUSTRIES	14- 67	20 1/4	-1 1/8	-5.2
A	MILGO ELECTRONICS	15- 42	19 3/8	+ 1/4	+1.3
N	MOHAWK DATA SCI	19- 87	35 3/4	+ 1/8	+0.3
O	ON LINE SYSTEMS INC	6- 23	13 1/4	+ 1/4	+1.9
O	OPTICAL SCANNING	11- 52	12 5/8	-2	-13.6
O	PHOTON	4- 17	8 7/8	- 1/4	-2.7
O	PHOTO-MAGNETIC SYS.	1- 6	1	- 1/8	-11.1
A	POTTER INSTRUMENT	15- 42	21	- 1/2	-2.3
O	PRECISION INST.	6- 25	11 1/2	-1 3/4	-13.2
O	RECOGNITION EQUIP	12- 83	22 1/2	- 1/2	-2.1
O	REDCOR CORP.	4- 34	8	- 1/4	-3.0
N	SANDERS ASSOCIATES	7- 29	18 3/4	+ 1/4	+1.3
O	SCAN DATA	5- 53	7 1/8	- 1/4	-3.3
O	TALLY CORP.	10- 23	13 7/8	- 3/4	-5.1
N	TELEX	10- 25	19 5/8	- 1/4	-1.2
O	VIATRON	1- 51	1 3/4	+ 1/4	+16.6
	SUPPLIES & ACCESSORIES				
N	ADAMS-MILLIS CORP	8- 19	17 3/4	- 5/8	-3.4
O	BALTIMORE BUS FORMS	6- 21	8 3/4	0	0.0
A	BARRY WRIGHT	6- 25	11	-1 3/4	-13.7
A	DATA DOCUMENTS	15- 35	26 1/4	-2 1/8	-7.4
N	ENNIS BUS. FORMS	9- 19	10 3/4	-2 3/8	-18.0
O	GRAHAM MAGNETICS	4- 22	22 3/8	+1 1/4	+5.9
O	GRAPHIC CONTROLS	5- 17	8 3/4	- 1/8	-1.4
N	MEMOREX	46-166	72 1/4	-3 7/8	-5.0
I	3M COMPANY	71-116	111 7/8	-2 3/8	-2.0
O	MOORE BUS. FORMS	25- 40	39 7/8	+ 3/8	+0.9
N	NASHUA CORP	21- 43	37 1/4	- 1/4	-0.6
O	REYNOLDS & R YNOLD	25- 48	47 1/4	+ 1/2	+1.0
O	STANDARD REGISTER	17- 30	21 1/2	-1 1/4	-5.4
O	TAB PRODUCTS CO	4- 13	13 3/8	+ 7/8	+7.0
N	UARCO	22- 39	27 5/8	-1 3/4	-5.9
A	WABASH MAGNETICS	7- 30	9 1/8	- 5/8	-6.4
N	WALLACE BUS FORMS	17- 41	21 3/8	-1 5/8	-7.0
	COMPUTER SYSTEMS				
N	BURROUGHS CORP	78-173	120	-1 7/8	-1.5
N	COLLINS RADIO	9- 37	18 1/2	- 1/4	-1.3
I	CONTROL DATA CORP	30-122	62 1/4	-2 3/8	-3.6
O	DATA GENERAL CORP	16- 59	32 3/8	-1 3/8	-4.0
N	DIGITAL EQUIPMENT	50-124	61 1/2	-2	-3.1
N	ELECTRONIC ASSOC.	3- 11	7 7/8	+ 1/8	+1.6
A	ELECTRONIC ENGINEER.	3- 14	8 1/4	+ 1/4	+3.1
N	FOXBORO	18- 41	38	0	0.0
O	GENERAL AUTOMATION	9- 42	22 3/4	+ 1/4	+1.1
N	GENERAL ELECTRIC	60-111	111 1/8	+ 3/4	+0.6
N	HEWLETT-PACKARD CO	19- 45	41 1/2	-1 7/8	-4.3
N	HONEYWELL INC	65-152	102 5/8	-11 3/8	-9.9
N	IBM	223-387	356	-5	-1.3
O	INTERDATA INC	3- 22	9 1/2	+ 7/8	+10.1
N	NCR	30- 86	43 1/2	-1 3/4	-3.8
N	RCA	18- 36	34 1/4	-2	-5.5
N	RAYTHEON CO	16- 40	39 3/8	+ 1/4	+0.6
O	SCI. CONTROL CORP.	1- 8	1 1/4	- 1/4	-16.6
N	SPERRY RAND	19- 40	34 3/4	0	0.0
A	SYSTEMS ENG. LABS	10- 49	15 1/8	+ 1/8	+0.8
N	VARIAN ASSOCIATES	9- 29	16 3/8	- 1/2	-2.9
N	WANG LABS.	18- 51	43	+ 7/8	+2.0
N	XEROX CORP	66-115	103 1/4	-2	-1.9
	LEASING COMPANIES				
O	BOOTHE COMPUTER	8- 25	19	0	0.0
O	BRESNAHAN COMP.	2- 9	3 1/8	-1	-24.2
O	COMPUTER EXCHANGE	2- 9	5	- 1/2	-9.0
A	COMPUTER INVSTRS GRP	4- 13	11 1/8	-1 3/8	-11.0
N	DATA PROC. F & G	6- 32	16 7/8	- 1/2	-2.8
O	DATRONIC RENTAL	2- 8	2 3/4	- 1/8	-4.3
A	DEARBORN-STORM	10- 35	34 1/4	-1	-2.8
O	DIEBOLD COMP. LEAS.	2- 11	9 5/8	-1 1/8	-10.4
A	DPA, INC.	3- 10	6 3/4	- 3/8	-5.2
A	GRANITE MGT	7- 22	10 7/8	- 1/8	-1.1
A	GREYHOUND COMPUTER	5- 44	10	- 3/4	-6.9
N	LEASCO CORP	7- 30	19 1/2	-1 1/4	-6.0
O	LECTRO MGT INC	1- 9	3 5/8	0	0.0
A	LEVIN-TOWNSEND CMP	3- 19	7 7/8	+ 3/4	+10.5
O	LMC DATA, INC.	1- 4	7/8	0	0.0
O	NCC INDUSTRIES	3- 8	7 7/8	0	0.0
O	SYSTEMS CAPITAL	1- 8	3 3/8	- 5/8	-15.6
N	U.S. LEASING	3- 23	21 3/8	- 3/8	-1.7

EXCH: N=NEW YORK EXCHANGE; A=AMERICAN EXCHANGE
L=NATIONAL EXCHANGE; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

Computer Stocks Trading Index



BASE FOR EACH TRADING INDEX: 100 as of 3/1/68

Earnings Reports

ADDRESSOGRAPH-MULTIGRAPH
Three Months Ended Jan. 31

	1971	1970
Shr Ernd	$.18	$.51
Revenue	98,100,000	102,500,000
Earnings	1,500,000	4,100,000
6 Mo Shr	.25	.93
Revenue	.25	.93
Earnings	2,000,000	7,500,000

DATA PACKAGING CORP.
Year Ended Nov. 28

	1970	1969
Shr Ernd	a$.22	$.77
Revenue	13,178,344	15,282,628
Spec Chg	b360,030	.....
Earnings	3,808	1,208,389

a-Based on income before special charge. b-From sale of 60% interest in Computer Access Systems.

ON-LINE SYSTEMS, INC.
Six Months Ended Oct. 31

	1970	1969
Shr Ernd	$.24	$.23
Revenue	1,132,599	659,405
Spec Cred	52,000	48,000
Earnings	106,092	104,931

LOGICON, INC.
Nine Months Ended Dec. 31

	1970	1969
Shr Ernd	$.37	$.30
Revenue	7,117,436	5,028,209
Earnings	317,007	241,392

GRAPHIC SCIENCES, INC.
Six Months Ended Dec. 31

	1970	1969
Shr Ernd	$.01	.....
Revenue	4,343,097	3,037,226
Earnings (Loss)	24,847	(2,665,278)
3 Mo Shr	.01	.....
Revenue	2,141,073	1,511,696
Earnings (Loss)	14,921	(1,234,959)

PROGRAMS & ANALYSIS, INC.
Year Ended Nov. 28

	1970	1969
Revenue	$1,398,000	$939,000
Earnings	17,000	2,000

MOHAWK DATA SCIENCES
Three Months Ended Jan. 31

	1971	1970
Shr Ernd	$.20	$.38
Revenue	23,305,000	25,880,000
Earnings	1,080,000	2,060,000
6 Mo Shr	.43	a.70
Revenue	45,085,000	50,835,000
Spec Cred	.....	b275,000
Earnings	2,345,000	c4,085,000

a-Based on income before special credits. b-Gain on revaluation of foreign currencies. c-Equal to 75 cents a share.

COMPUTER PROPERTY CORP.
Year Ended Dec. 31

	1970	1969
Shr Ernd	$.66	$.76
Revenue	4,372,571	3,659,552
Earnings	443,623	513,681

GENERAL AUTOMATION
Three Months Ended Jan. 31

	1971	1970
Shr Ernd	$.06	.....
Revenue	2,985,000	$1,521,000
Earnings (Loss)	103,000	(646,000)
6 Mo Rev	5,335,000	2,713,000
Loss	70,000	1,060,000

APPLIED DATA RESEARCH
Year Ended Dec. 31

	1970	1969
Shr Ernd	.....	a$.16
Revenue	$7,189,537	6,151,405
Spec Chg	.....	b45,570
Earnings (Loss)	(226,646)	c104,139

a-Based on income before special charge. b-From a plane crash and resulting fire at plant in Princeton, N.J. c-Equal to 11 cents a share.